The EXCAVATING ENGINEER

Vol. XXII No. 11

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NOVEMBER 1928

UMI

"In the worst digging we've ever done—absolutely no trouble"—

— writes Nello L. Teer, Durham, N. C., one of North Carolina's largest and best known general contractors. Then he—

bought another Gas + Air (his 3rd)

Just before buying his 3rd Gas + Air BUCYRUS-ERIE, Mr. Teer was using two of these shovels in some of the toughest digging to be found in North Carolina, and reported:

"I have been amazed at their performance and low upkeep." And he writes us about this work:

> "I have not words to express to you my entire satisfaction with these Gas + Air shovels. Have been using them in some of the worst digging we have ever done, and have had absolutely no trouble with them. The BUCYRUS-ERIE Gas + Air machines will dig much harder material, with less effort, and with considerably more speed."

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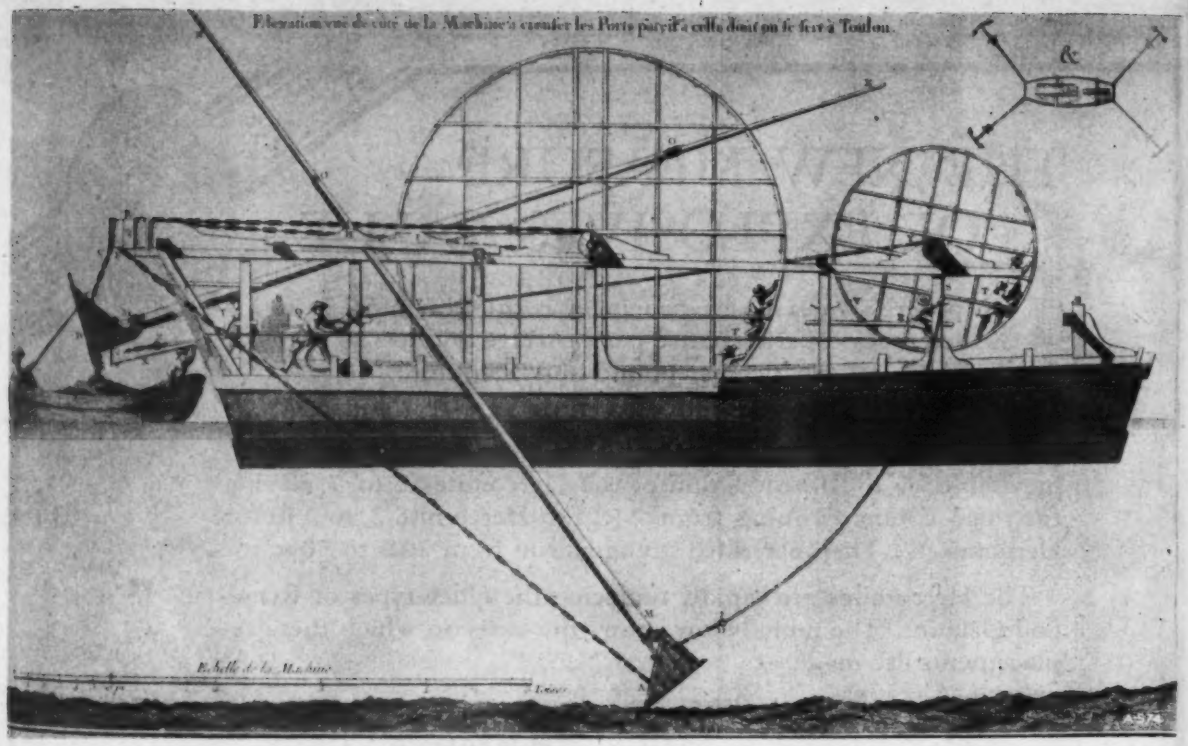
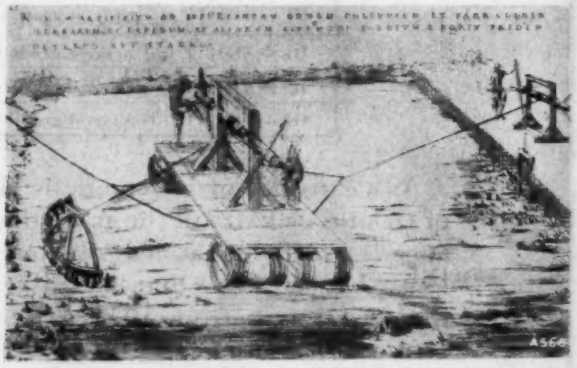
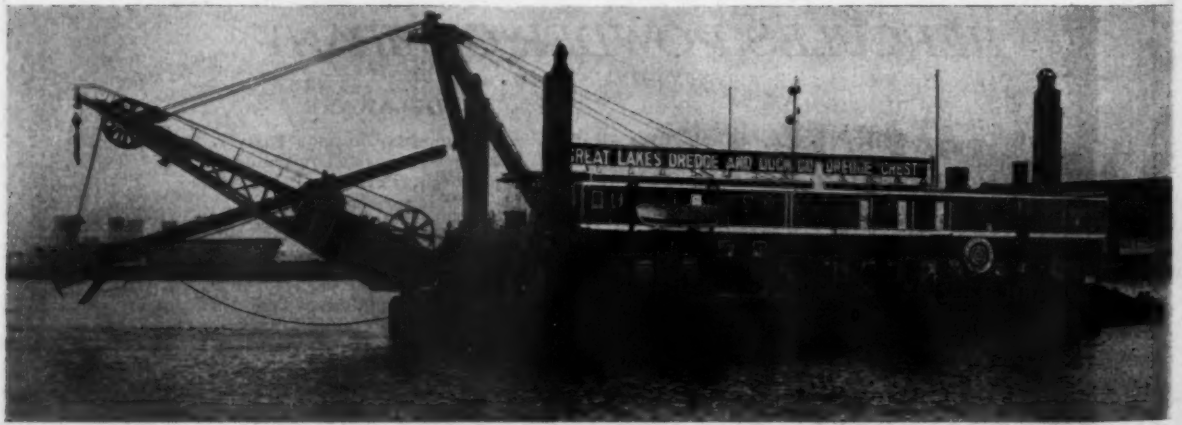


Bucket Dredge Operated by Men in Tread Wheels. Bernard Forest de Belidor, 1736. Closely Approximating the Modern Dipper Dredge in Principle.

Dredge Plan of Over 400 Years Ago. Leonardo da Vinci. Drawing of 1513 or 1514 A. D. Reproduced in the Book of Ravaisson — Mollien, 1881.



Original Form of Dragline Operated from Platform of Pontoons. John Besson, 1578. Compare with Modern Dragline Shown in Illustrations on Page 418.



The Dredge "Crest" Uses a 10-Cubic-Yard Rock Dipper and a 16-Cubic-Yard Dipper in Mud. This Bucyrus-Erie 1600 Horse Power Diesel-Electric Dipper Dredge Is Owned by the Great Lakes Dredge and Dock Company. The Largest and Most Modern Dredge Afloat.

The
EXCAVATING ENGINEER

Vol. XXII NOVEMBER 1928 No. 11

Dredges: Earliest Developed of Mechanical Excavators

By WILLIAM F. PARISH

Though Crude and Sometimes Almost Fantastic, Primitive Dredges Contain the Germs of Many Ideas Used in Modern Excavators — An Important Factor in the Advance of Civilization.

By the courtesy of the author, WILLIAM F. PARISH, *and Oil Power, Standard Oil Company of New York.*

The Oldest Known Illustration of a Dredge. Fontana 1420. From Feldhaus "Die Technik."

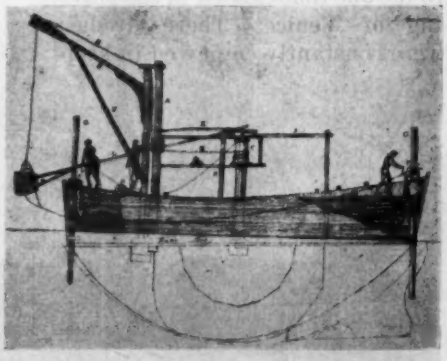
THE development of the dredge is a most instructive illustration of how man has adapted the nearby rivers, bays and sounds to fit his needs. One day some early trader may have used a rude raft to float his goods down the river. He found this easier than carrying them through the forest. In time later traders made larger boats that sailed farther away and carried more men and goods. But these boats required deeper water for the home port, so men dug deeper harbors in a manner consistent with the times they lived in.

First came the adaptation of the simple methods employed on land. As the projects became larger these were made more elaborate. The windlass was introduced when greater loads required some mechanical assistance, then great treadmills on which many men trod. Later, horses were substituted for the men until the steam engine was introduced by Watt. This eventually made dredging practicable over a range much wider than had ever before been considered possible.

Great excavators were built to dig the cuts for the Panama Canal; other immense dredges are keeping rivers and harbors open for modern ships of war and commerce; giant shovels remove earth, coal and ore in mining operations. These machines are operated by every form of motive power: steam engine, steam turbine, gasoline, Diesel engine, or by electric motor. The smaller types of these machines dig foundations and subways, and they even remove snow from highways and city streets. The assistance which heavy machinery has given to man in his onward march was never better exemplified than by the history of dredge development.

What is probably the original form of dredge was still in use in India some years ago. It was used to scoop out the mud and sand from moderately deep rivers. This most primitive implement is an adaptation of the large hoe or scraper used on dry land. It is called the "Jham," a name of very appropriate sound, probably derived from Indian adoption of some English engineer's remarks as to the necessary action to accomplish results when using this tool.

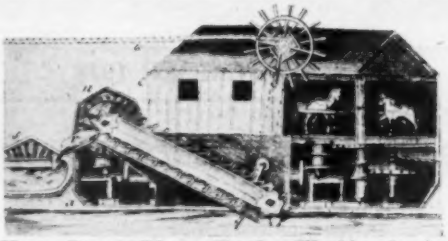
The operation is simple. A native takes the apparatus and dives off a plank into the water and to the bottom, the weight of the shovel being more than sufficient to overcome his buoyancy. He then pushes the point of the blade down in the sand as



Improved Form of the Amsterdam Continuous Dipper Dredge Operated by Horse Power. Jacob Leupold, 1725. A Predecessor of the Placer Dredge of Today.

far as possible, working as long as his breath holds. After that he comes up and rests upon a plank, while his mates above on a scow or on the bank pull on the rope and bring up as much sand and mud as possible. Nothing could be more primitive than this operation and equipment.

In very olden times, when loads were light and towns were built where it was not necessary to dredge rivers and canals constantly, any primitive equipment was satisfactory. It was possible even to drive horses attached to this scraper or use wide-bladed plows into the shallow water. Such silt and mud as filled the channels or flowed against the docks could be removed by these methods. Eventually such low-lying countries as Holland became inhabited and the struggle for life became against the encroachment of water. Then ingenuity was spurred by necessity, and the improvement in design was more rapid.

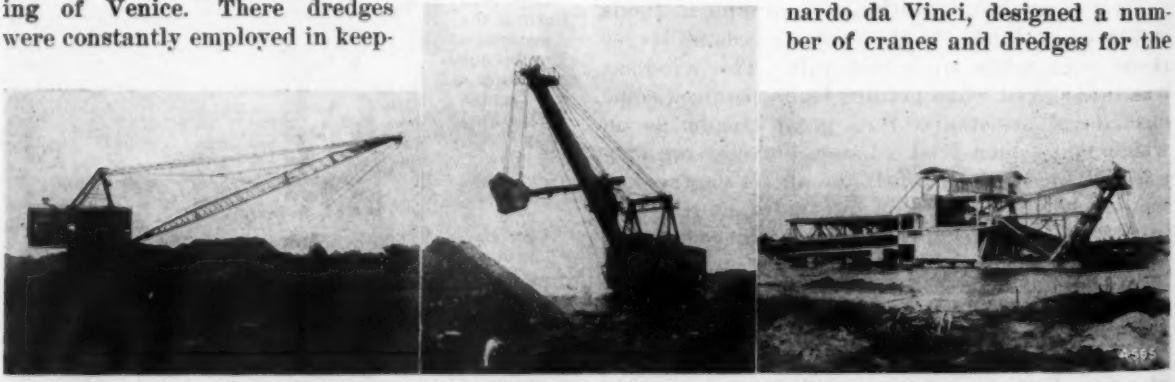


Horse Power Dipper Dredge Working in the Hudson River at Albany—American Magazine, 1788. Courtesy Metropolitan Museum of Art, New York City.

Practically the entire country of Holland is below the level of the surrounding sea, which is kept back by man-made dykes. These dykes serve as roadways, but the system of canals for the barges and boats constitutes the important method of transportation for goods and people in the low-land districts. The boat was of prime necessity. The canals were the streets; so keeping them open at all times and deep enough for traffic was a matter of national importance. The dirt and sand from the bottom of the canals, when removed, served the double purpose of clearing the channel and strengthening the dykes. The magnitude of the work called forth all the ingenuity of these clever people in designing large apparatus for carrying on this work. Their problem was similar to the one that existed in the building of Venice. There dredges were constantly employed in keeping the waterways open and clear from the silt constantly carried down by the river.

The fundamental parts of these early dredges for water operations consist of a platform on a scow or pontoon upon which the workmen stand and to which the machinery is attached. The basic feature is a long pole, properly fastened in a yoke or large oarlock on the side or end of the pontoon. On the end of this pole is fitted the spoon or bucket-shaped contrivance which, in the earliest forms, was made of strong canvas fitted over an iron frame. This bucket was called the ladle or scoop. It has taken many forms during its evolution and one of the most interesting is also the oldest in literature, the dredge shown by Fontana in his manuscript in 1420. Here is a pontoon with an open well in the center through which the long double dredge-arm is worked. The under part is made of a hollowed-out tree, forming a trough, its lower end being fitted with an iron, spoon-shaped scoop. On the top of the scoop is hinged a spoon-shaped cover that is held open, when being pushed into the sand, by the long pole attached to it. This cover is closed before the entire device is pulled up by means of the ropes and windlass. The sand discharges through the back of the scoop along the trough when the scoop end is pulled up above the level of the rollers that support the trough. This rather complicated affair has all the indications of having been under development for a considerable period before the date when an account of it was published. It includes principles and complications that would require the trying-out and scrapping of a considerable number of former devices before this one was developed.

That great master mind, Leonardo da Vinci, designed a number of cranes and dredges for the



Present Day Excavators. Left: 320-B Electric Dragline Used for Stripping by the Pyramid Coal Company, Marion, Illinois. Center: 750-B 12-Yard Stripper Operated by the Enos Coal Company, the Largest Stripping Shovel Yet Built. Right: A Bucyrus-Erie Electric Placer Dredge Mining Alluvial Tin in the Dutch East Indies. The Buckets Comprising the Bucket Line of This Dredge Are of 7-Cubic-Feet Capacity.

canals and great waterworks which he planned and constructed in different parts of Italy.

The drawing of the revolving dredge with text appears in the collection known as Manuscript E of the Institute of Paris reproduced in the book of Ravaisson — Mollien, Vol. 3, published in 1881. This drawing was made in 1513 or 1514 A. D., and da Vinci has the following to say of it in the odd technical language of his day, written in his characteristic backhand script: (See page 416.)

"How to Excavate Sand or Dirt"

"The handle *n*, when turned makes a small wheel move and this little wheel makes the gear wheel *f* move. This wheel *f* is jointed to the cross piece of the arms carrying the earth from the bottom, which is discharged forward on the barges. But the 2 ropes *mf* and *mc* roll up around the axle,

Original Form of Scoop Operated by Men at Windlass on Shore. Olaus Magnus 1555.

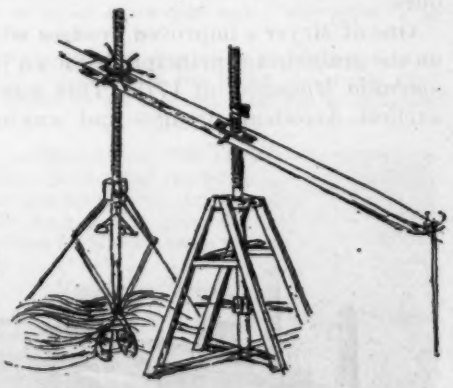
make the instrument with the 2 barges go towards *m*, and these ropes are very useful for that kind of work. The axle has the advantage of being lowered, so that the wheel can be so low, as to make the water of the marsh deeper."

One drawing, of such large dimensions that it cannot be reproduced here, appears in the collection of manuscripts called the Codice Atlantico, 1490 to about 1518 A. D. This shows a double crane affair with an immense tread-wheel in the center in which many men could walk to furnish the power that draws up the buckets. The canal was a dry digging, the buckets were filled by man power. Da Vinci wrote that every bucket would hold 20 wheelbarrows full of earth, making a total load of 3,000 pounds.

Another great drawing in the same series of manuscript shows a second form of gigantic crane set in the canal and made so that it would lift the basket from two levels, swinging them over to and clear of the side. Da Vinci shows a sketch of a clam-bucket dredge which contains everything necessary for conducting operations from a pontoon or from the bank of a stream or canal. The main mast, which is supported in the derrick, has a clever adjustment feature so that the cross-member can be fixed at the proper height for the work. This cross-member carries a second, also adjustable, upon which is hung the dredge dipper. The dipper is like a great pair of shears with two large spoons or clam-shaped dippers pulled together by ropes that pass through pulleys. There is an arrangement for opening the jaws of the dipper as it is put down, and then of fastening the shear-arms to the pole, that keeps the jaws of the dipper closed while it is being pulled out of the water and turned in the direction needed for discharging the load. The motive power to work the jaws of the dipper is supplied by windlass or by men pulling on the ropes. The cross-member is pulled down by the weight of a number of men in order to pull the bucket out of the water and swing it to its unloading position. The idea of this dredge was later used by Lorini in his work on fortifications published in 1597.

Olaus Magnus, a celebrated engineer and architect, in his book entitled "A Compendious History of Goths, Sweds and Vandals," 1658 A. D., shows a cut of a primitive form of drag used to scrape the sand from the bottoms of rivers. This is worked by a windlass on shore, a boat being necessary to take the drag hook out to the proper place in the river before each operation of pulling it in.

Jacques Besson was a French mathematician and mechanician, and spent a great part of his life in mechanical researches, in the prosecution of which he visited foreign countries. His "Theatre," 1579 A. D., contains such devices as he collected abroad, as well as those invented by himself. He shows a drag bucket operated from a pontoon upon which two men are standing and working a windlass. The pontoon is fastened by ropes to windlasses on each shore, so that it can be dragged back and forth, this arrangement being necessary because there was no method of placing the drag

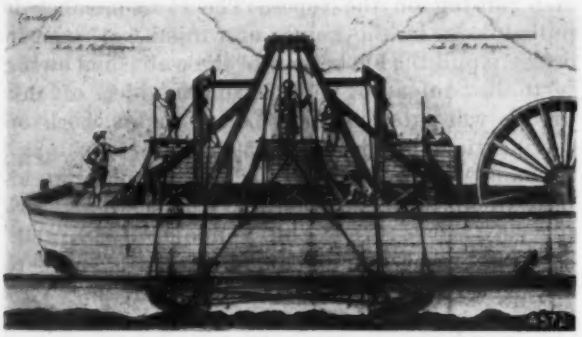


The Dredge Designed by Leonardo da Vinci — Codice Atlantico — About 1500.

bucket away from the pontoon. The bucket is dropped over into the water, and the pontoon is then pulled by the shore windlass away from the bucket; after this operation, the windlass on the pontoon does the main work. (See Page 416.)

Gio Domenico Gerra shows an elaborate workout of a grab bucket in his book printed in Genoa in 1673. Each bucket is handled from a separate set of hand windlasses. They are drawn together under water by ropes running over pulleys and finally are pulled up by the large central windlass.

Cornelius Meyer is credited with having designed the first horse-operated dredge. This was built in 1685 and was used in Holland. This date can be taken as showing the general increase in the size of ships and commerce, which made necessary more improved methods of dredging the important waterways. The use of horses in working all kinds of heavy wooden machinery, such as mine windlasses, stamp mills and similar primitive machinery, was general, and the evolution of the dredge was such that a desire for greater capacity would be bound to bring in the use of animal power sooner or later. Meyer's dredge was the older man-powered machine, with the one improvement of horse motive power, but this greatly increased the effectiveness of the work and reduced its cost, as well as making the machine available over a wider territory. The general economics of the problem were about the same in those days as in ours.



Contrast This Original Form of Clamshell Dredge. Gio Domenico Gerra, Geneva, 1673.

One of Meyer's improved dredges which worked on the grab-bucket principle is shown in the *Pennsylvania Magazine* of 1775. This was one of the earliest American dredges and was operated by horse power. The grab-bucket was swung from the end of a crane boom. It was lowered by means of the ropes attached to the sides which keep the buckets opened, the center rope being slack. Power was then applied through the central rope and the bucket pulled up. This same action pulled the buckets shut and enclosed the sand or mud. The contents were dropped into the scow when the buckets were opened by releasing the pull on the center ropes and holding with the rope fastened to the outside.

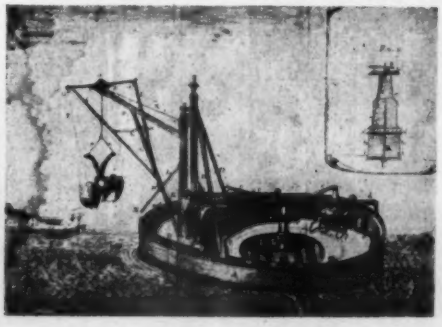
Another American dredge, called a "Dock Drudge," was shown in the *American Magazine* of 1788. This drudge was 54½ feet long and 31 feet wide and was worked by horses. The description read, "The plate on the opposite page is the figure of the *Dock-Drudge,* a boat with machinery for clearing docks and rivers, an ingenious and very useful invention. It was constructed in 1787, by Messrs. Stevens and Connoly of this city, at their own expense and for public benefit; and now belongs to the corporation of the City of Albany. It is judged that two hundred tons of mud and sand may be raised in a day and lodged on a wharf or in a scow." (See Page 418.)

One of the earliest applications of Watt's steam engines was to take the place of man power in a dredge. A letter from the firm of James Watt and Company is on record which states, "Our firm supplied in 1796 a beam engine having a steam cylinder 12⅛ inches in diameter and 3-foot stroke for working the spoons which were previously worked by men for cleansing Sunderland Harbor. These spoons were in the form of a truncated cone, the narrow end of which was closed; to the other, or opened end, was fixed a spade bit. These were made of hides of leather, having an iron rim. The engine was to be fixed in a boat 20 or 22 feet wide by 60 feet long." Naturally, it took a considerable time to displace all the horse-powered dredges that were being used in the various countries with this newer form of motive power but, eventually, with the onward march of mechanics, the older method was superseded, just as the horses displaced the

The 30-inch Diesel-Electric Bucyrus-Erie Hydraulic Dredge "New Jersey" Owned by the Great Lakes Dredge and Dock Company. This Dredge Has Diesel Engines Developing 4750 Horse Power Aboard Her. She Is the Largest in the World.

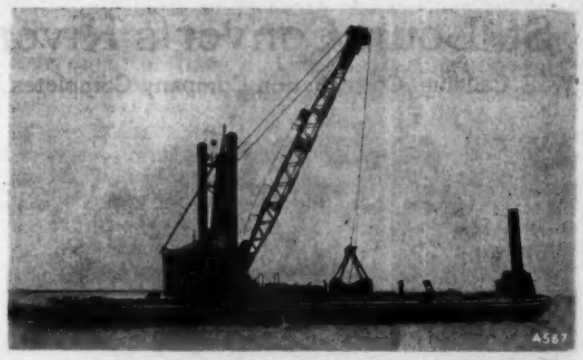
men tugging on the many ropes or pulling at the windlasses or patiently walking up the endless floor of the treadmills.

De Witt Clinton, when a U. S. Civil Engineer, made an inspection of a steam dredge working in the Hudson River at Albany and reported to Lieut. Col. Albert, Topographical Engineer, of its operation. The report is in the records of the 22nd Congress, March 30, 1832. He says, in part:



Grapple or Clamshell Dredge Operated by Horse Power. Pennsylvania Magazine, 1775. Courtesy of Metropolitan Museum of Art, New York City.

"The changes that occur in the beds of all streams are of such a nature as would require more or less labor to remedy the injuries the channels would receive. It would therefore be necessary that we should always have at command a power which we could apply for that purpose. That power is the Dredge and we can rely with confidence on its ability to perform such labor as we may require. By the application of steam power the practical utility of the dredge has been much increased. It has also lessened the expense of excavation in a ratio corresponding with the improvements of its machinery and its strength; and, at this time, it may truly be considered as so important an agent as to have rendered many river improvements attainable which before were considered impracticable . . . ."



360 Horse Power, Five-Cubic-Yard, Diesel-Electric Clamshell Derrick Dredge. Compare with Primitive Clamshell Dredge on This Page.

From this period on through the steam-engine era, the improvements made in dredges of all forms for working in water and steam shovels and excavation machinery for working on land were of such a nature that a large industry has developed. The applications increased as the machinery became more efficient so that it could be operated at lower cost. Without the use of this important machinery we should not have today great coal, iron and copper mines, the great canals, safe harbors and river improvements, railroads, highways, irrigation and drainage projects, dams, skyscrapers and subways, or a host of other aids to civilization which modern excavating equipment has made possible.

Speaking of Shovels

Here is a photograph which we recently found in one of our old files. It shows an English shovel of mast type, back in the old days of the railroad-type

machine. Looks almost like a battleship, doesn't it? Notice the chain drive to the shipper shaft. Also the wooden wheels on the dump car.

"Babe Ruth walked twice today."
"Gosh, she should be more careful whom she rides with."
— *Cornell Widow.*

A Laugh or Two.

A Gallant Answer

"You seem to be an able-bodied man. You ought to be strong enough to work."

"I know, mum. And you seem to be beautiful enough to go on the stage, but evidently you prefer the simple life."

After that speech he got a square meal and no reference to the wood pile.

No Street Cars, Then!

When Noah sailed the water blue
He had his troubles, same as you.
For forty days he drove the Ark
Before he found a place to park.

Vanishing Miracle

Tillie: "What would you call a man who hid behind a woman's skirts?"

Willie: "A magician."

Mrs. Jones: "I don't believe Helen's young man is just all we thought he was, John."

Mr. Jones: "What's the trouble now?"

Mrs. Jones: "He hung his hat over the keyhole."

Ma: "Where's the cow, Johnnie?"

Johnnie: "I can't get her home; she's down by the railroad track flirting with the tobacco sign." — *Exchange.*

St. Louis Converts River Des Peres Into a Sewer

W. E. Callahan Construction Company Completes Important Sections of Eleven Million Dollar Project

Modern Electric Dragline Excavators Used on the River Des Peres.

THE River Des Peres drainage work consists of a thirteen-mile project for converting the unsanitary and destructive River Des Peres into a sewer. This river follows the St. Louis city limits for the lower six miles of its course, then dips into the city for about three miles through industrial territory, and then inclines back toward the limits through a four-mile course of park and residential neighborhood. It drains about one-third the area of St. Louis and a large area outside the city. Of the $88,000,000 bond issue voted on in 1922, $11,000,000 was set aside for the completion of this entire project, consisting of nine miles of separate sanitary and storm sewer and four miles of combined sewer.

The work was started in March, 1924, and this article covers Sections J, B-2 and C, all of which were awarded to the W. E. Callahan Construction Company of St. Louis. They began work on their section of the project in July, 1926, and finished in the fall of 1927.

Hard Limestone Encountered on Sections B-2 and C

The contrast in methods used on Section J and Sections B-2 and C of the River Des Peres was not due to any personal prejudice, because all sections were built by the same contractor. The contrast was due to the fact that on this same troublesome little stream Section J stretched for three miles through an undeveloped part of the city, with the channel to be dug entirely in earth, while Section B-2 and C stretched for two miles through a well-developed industrial district, with the top eight feet to be dug through artificial fill, the next twelve feet through natural earth and the bottom nine feet through hard limestone.

600,000 Cubic Yards of Earth on Section J

Little need be said of Section J other than that it was a typical canal job containing about 600,000 yards of earth. The bulk of the earth was dug with a Bucyrus Class-24 electric dragline mounted on

trucks. The spreading, digging of pilot ditches, etc., was done with a 3-T Monighan. The channel is unlined at present.

650,000 Cubic Yards of Earth and Rock on Sections B-2 and C

In Sections B-2 and C the complications mentioned above precluded the use of big draglines alone. Here there were three operations to the excavation: stripping top rock, excavating the channel and excavating the foul water sewer rock.

A Portion of Section B-2 and C Practically Completed.

The excavation quantities involved were 500,000 yards of earth and 150,000 yards of rock. 75 per cent of this excavated material had to be hauled.

Dragline operation was chosen for the stripping. Its only rival for efficiency would have been a shovel with a 75-foot boom and sticks able to load at the top of the bank. The dragline possessed the advantage of being able to spread out some of the material where space was available for wasting it on the side. It had, however, the disadvantage of not being able to carry out the second and third operations. A 2½-yard Monighan was used to handle this dragline work, with Bucyrus 50-B's and Eries used for rock excavation.

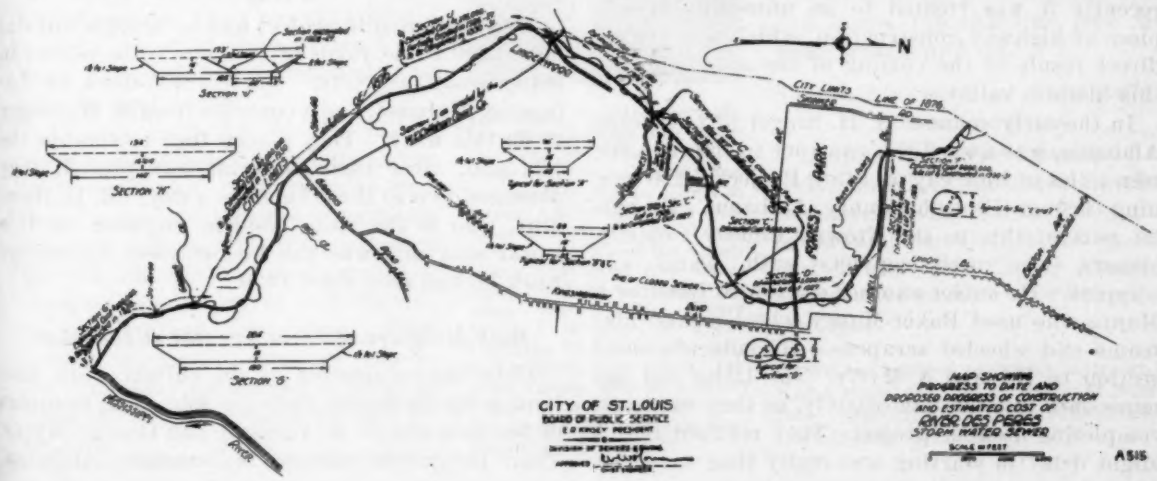
Excavation of the rock was done by shovels. Bucyrus 50-B shovels with extra high-lift boom and sticks were used on the channel rock, because they were the largest and most powerful machine that could clear underneath the various bridges. Caterpillar machines were a necessity on account of frequent shifting and manoeuvering necessary on account of floods and obstructions.

Speeding Up the Strippers' Operations with One of the Bucyrus 2-yard Heavy Duty Machines. The Erie in the Foreground Is All Set to Dig as Soon as the Powder Monkeys Finish Shooting.

Eries were used to dig the foul water sewer section. They traveled on 14-inch x 14-inch timber mats spanning the trench. While one Bucyrus 50-B and one Erie dug most of the rock, at one place it was possible to open up a "dead-end" section and here an extra Bucyrus 50-B and an Erie were put to work for about two months.

A Young Flood Catches One of the 50-B's in the Rock Excavation.

Neither could hauling be accomplished by a single method. For the stripping, trucks, standard gauge cars and narrow gauge cars were used. In the crowded places where trucks were necessary, the excess material was trucked out ahead of the big stripping dragline, by loading trucks with the



smaller shovels. Both the standard gauge and the 36-inch gauge cars, of course, were loaded at the top of the bank by the dragline doing the stripping.

Cranes Used to Raise Excavated Material to Top of Bank

For the channel rock the trucks or 36-inch gauge cars were carried on ramps down into the cut if possible, but in the crowded industrial sections it

Section J Consisted of 600,000 Yards of Earth, Most of Which Was Handled by This Bucyrus Class-24 Electric Dragline.

was necessary to transfer the excavated material to trucks on top of the bank by rehandling with ten-ton caterpillar-mounted cranes which served the shovels.

Blasting practice improved in efficiency during the progress of the job. A significant fact, however, is that, in spite of all the congestion, only two accidents were reported due to blasting. No mats were used to cover shots.

Work Finished 24 Weeks Ahead of Schedule

The work on Sections B-2 and C was completed in sixty-five weeks or twenty-four weeks ahead of the schedule. The work was handled under the supervision of W. W. Horner, Chief Engineer of Sewers and Paving for the City of St. Louis. Paul Grafe, Vice President of W. E. Callahan Construction Company, was in charge of the work for the contractor.

At present the W. E. Callahan Construction Company is engaged on a large sewer job in Louisville, Kentucky, and also has just been awarded the contract for the Marseilles Canal by the Illinois Waterway Commission. This project consists of excavating a 200-foot bottom ship canal two miles long and involves 1,100,000 cubic yards of excavation. The cost will run close to $600,000.

Officers of W. E. Callahan Construction Company are as follows: W. E. Callahan, president; Paul Grafe and H. McFarland, vice-presidents; and William McCormick, secretary and treasurer.

Averaging Over 1000 Yards a Day with a ¾-Yard Shovel

Breland and Myers Turn Out 24,600 Cubic Yards in September — 23 Working Days — on Their Subcontract from A. H. Singer at Etowah County, Alabama.

THE western slope of Lookout Mountain has watched a variety of sights from early Indian days down through the War between the states to the coming of the automobile. Just recently it was treated to an unusually speedy piece of highway construction, which was the indirect result of the coming of the automobile to this historic valley.

In the early summer A. H. Singer of Lafayette, Alabama, was awarded a contract to improve sixteen miles of highway on State Project S-216 running through Etowah County, Alabama. He sublet part of this to the Etowah County Commissioners, who used convicts with teams and scrapers. He sublet another section to Lassiter & Mann, who used Baker-Maney wheelers and also teams and wheeled scrapers. He sublet a third section to Breland & Myers. The latter did not move onto this job immediately, as they were just completing another project. They realized that a slight delay in starting was really time saved because it gave the culvert men a chance to get out of the way.

Fast Concrete Work Completes Three Culverts a Day

This sixteen-mile project had no bridges but did have 2300 cubic yards of concrete to be placed in many small culverts. Garrett Brothers of Lafayette, Alabama, had a contract from A. H. Singer to do this work. They placed four mixers on the job, and, after their material was placed, they averaged two to three culverts a day. R. L. Hawkins, who is the state resident engineer on this work, said this was the fastest piece of culvert work he had seen since 1920.

Both Members of Firm Are Old at the Game

Upon the completion of the culvert work Breland & Myers moved onto the job. The members of the firm are D. A. Breland and George Myers. Their permanent address is Bessemer, Alabama.

Route 5, but for this job they established headquarters at Keener, Alabama. Mr. Breland is a graduate civil engineer, and had been with the State Highway Department five years when he joined with Mr. Myers in this work. His familiarity with engineering and his many years of experience now stand him in good stead.

George Myers has had a variety of experience in actual construction work in Alabama, in Georgia and in Tennessee. He has worked for county officials and for prominent contractors. He has the reputation of being able to take hold of a job which is dragging, catch up the loose ends and rush the job through to completion.

The Operator, J. D. Liles, the State Highway Engineer, R. L. Hawkins, and George Myers Posed for a Snapshot in Front of the Shovel. Mr. Breland, the Partner of Mr. Myers, Was Absent, Lining Up a Contract for 120,000 Cubic Yards in Another Part of the State.

Bucyrus-Erie B-2 Equipped with Dipper Fills One Wagon Every Two Passes

They started this job with a brand new Type B-2 Bucyrus-Erie steam shovel. Although the machine is designed to carry a larger dipper, they chose a ¾-yard size because two dippers would fill one of their 1½-yard wagons.

They first used eight 1½-yard wagons with the mules hitched "three-up," then they increased this to ten wagons. They buy six-year-old mules instead of younger stock because they stand the punishment of a day's work better.

As this road lies in the valley, there were no very heavy cuts except in borrow pits. The yardage produced seems all the more remarkable for this reason. They encountered no rock, but the clay in a number of the borrow pits proved stiff digging as it contained some chert. They worked ten hours a day, but on very hot days they quit about 4:30 p. m. when the stock showed signs of overheating.

The Ditch Pictured with Mr. Myers on the One Side Is for Drainage Purposes. It Is as Wide as the Dipper, and Ranges from 2½ to 4 Feet in Depth. Although This Material Was Sandy, the Large Bearing Surface of the Caterpillars Prevented Any Caveins. As Can Be Seen, No Mats Were Used. There Were a Number of These Drainage Ditches on the Job, and in Each Case a Neat Job Was Turned Out in a Short Time at a Nominal Cost, Effecting a Considerable Saving for the Contractor.

The Proof that Co-operation on a Job Means Something

The heat did not seem to bother the men. As the yardage rolled up they seemed to push the work with increasing vigor. There was a splendid

The B-2 Bucyrus-Erie in a Borrow Pit, Eating Its Way into a Cotton Patch. A Number of the Cotton Bolls Can Be Seen Over the Boom Engine.

spirit of co-operation all along the line, operator, fireman, drivers and dump men. It was as though they were racing with another crew. They thought yardage and they talked yardage. They looked ahead and avoided mistakes as far as possible. The results were worth while.

When the estimate was taken up in August they found that in twenty working days of the length mentioned above and with a ¾-cubic-yard dipper, they had moved 18,500 cubic yards. In September there was some rain, but in 23 full working days they produced 24,600 cubic yards.

This machine was operated by J. D. Liles, who had already made some enviable records with other contractors in this state.

The fireman was Clyde Adams. He has co-operated with Liles to the fullest extent. He has kept his consumption of coal down to but slightly over a ton a day. He helps, of course, with the greasing and oiling, and keeps the machine free from waste grease and oil.

Shovel Always Kept Constantly in Good Condition

Despite the large amount of material moved, this is one of the cleanest shovels in the state. The engines, boiler and smokestack are painted periodically with Crater compound and always present a well-kept appearance.

We are indebted to George Myers of Breland & Myers and to R. S. Welfer of Bucyrus-Erie Company, Birmingham Office, for the story of this work in Alabama.

The EXCAVATING ENGINEER

A Monthly Publication Devoted to Excavating and Allied Subjects

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The Business Situation

The middle of October found the construction industry still going ahead at a very satisfactory rate. September construction contracts in the territory east of the Rocky Mountains reached a total of $587,674,000, according to the F. W. Dodge Corporation. The area covered in this record consists of 37 states and includes approximately 91 per cent of the total construction in the United States. The total of contracts awarded was the highest September contract total on record. It was 13 per cent ahead of the total for the same month of last year and 14 per cent ahead of August, 1928.

The September record brought the total amount of new building and engineering work started since the first of this year up to $5,132,944,100, representing an increase of 7 per cent over the corresponding period for 1927.

An analysis of the record showed the following outstanding items: $202,806,900, or 35 per cent of the total, for residential construction; $119,013,600, or 20 per cent, for public works and public utilities; $114,780,300, or 19 per cent, for industrial buildings; $60,068,000, or 10 per cent, for commercial buildings; $38,800,500, or 7 per cent, for educational buildings; and $23,845,700, or 4 per cent, for hospitals and institutions.

New projects contemplated which was reported in 37 states amounted to $522,655,600, a decrease of 15 per cent from the total reported in the preceding month and a drop of 17 per cent from the amount reported for September of last year. The United States Department of Commerce chart for building contracts reproduced below shows a very consistent improvement of this year over last.

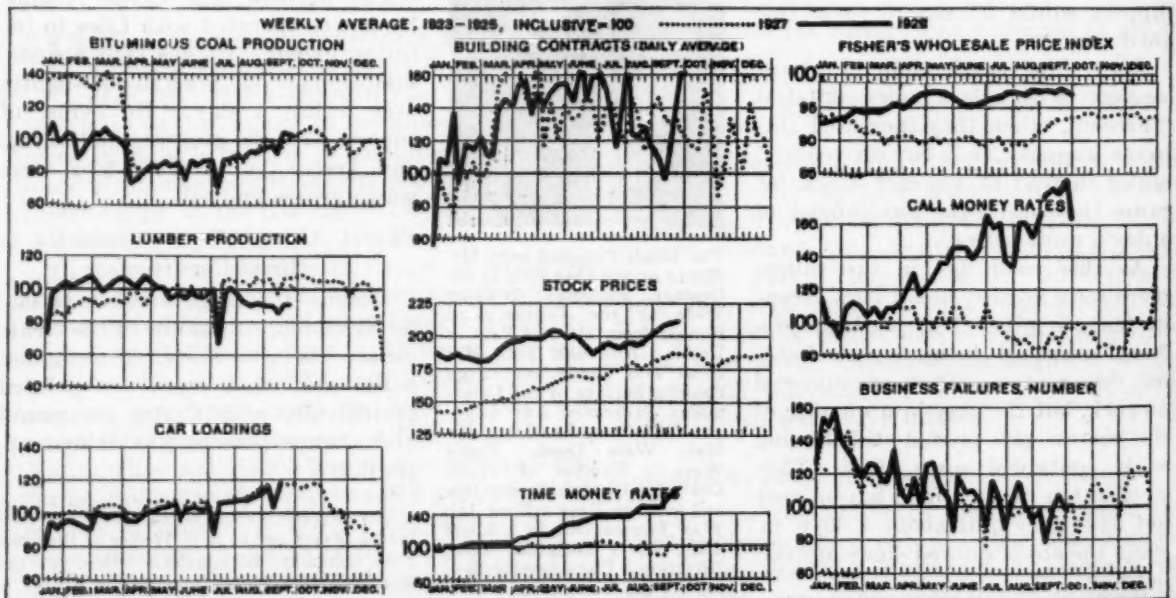
The bituminous coal production is riding right along on a par with last year's figure.

Steel shows a very satisfactory volume, and the total unfilled orders on the books is a great deal higher than it was last year or than it has been for some years past.

We have heard a good deal this year about the narrowing margins of profit but the record of business failures, as shown by the chart, is not very much higher than last year, and the number of business failures appears to be not more than the normal weeding out of the inefficient companies. The efficiently-managed companies are still making money.

Stock prices, as this is written, are making a rise; but this has ceased to be a barometer of business and industry. The market today is one where

WEEKLY BUSINESS INDICATORS



only the most completely informed. can hope to speculate and make money.

Call money rates are very high and time money rates have followed call prices upward, but still there appear to be ample funds for speculation as well as for business.

The monthly map of the Magazine of Business shows a great predominance of average and above average signals, while here and there in the East and in the Middle Western states are a few localities from which are reported below average conditions. The map, which is based on the reports of business men in all sections of the country, sets forth a very satisfactory situation.

Japanese Operators Handle Dragline After One Day's Training

At the mouth of the Shimano River lies the city of Niigata, a port on the west coast of Japan. Here the Japanese Home Department, Niigata Branch, operate the Bucyrus-Erie 41-B steam dragline illustrated in the accompanying pictures. It is interesting to note that the machine is being run by native operators, who have received only one day's training in the operation of the machine.

Photos Courtesy of Mitsui & Company, Ltd.

At the time C. F. Bigham, erector for the Bucyrus-Erie Company, gave the operators their schooling, it hailed and snowed continuously, and the water and mud was almost knee deep.

Mud was also a problem at the time the pictures were taken, and it was necessary to operate the machine on a mat of logs.

From THE MAIL BAG

More Information Wanted About Blasting in Hot Areas!

Dear Sir:

I have read with interest your article on increasing production in United Verde Lower Pit Operations, published in the September issue of *The Excavating Engineer*, particularly the article on page 345, wherein you describe the method of blasting in hot areas.

We have recently purchased a Bucyrus-Erie 120-B electric shovel for our Summit Hill Stripping, and we are greatly interested in obtaining any additional data covering methods used in blasting hot areas, as at this particular job we will encounter temperatures at the top of the blast holes as high as 200 degrees F. We plan slushing the workings with fine silt deposited from a 10 per cent solution, thus cooling the areas wherever possible, and also sealing fine heat-carrying fissures.

Where it is impossible to cool the rock sufficiently by slushing, it has been suggested that metal containers be used and a charge of 40 per cent or 60 per cent gelatin dynamite in stick form, strength according to the hardness of rock encountered; be placed in same and fill the remaining space in the container with water, the idea being that if excessive heat is encountered the mass in the container will never reach a higher temperature than 212 degrees F., the temperature of boiling water under no pressure condition, which temperature is not high enough to explode or disintegrate the gelatin charge.

Any additional data and detail regarding this question you may have will be of benefit to us. Also, if you can suggest anyone connected with the United Verde operations, to whom I could write relative to blasting hot areas, I will appreciate this information.

Very truly yours, W. S. RAUSCH
Mining Engineer.

The Lehigh Coal and Navigation Company,
Lansford, Pennsylvania.

The Excavating Engineer would greatly appreciate hearing from engineers who are up against the same problems which confront Mr. W. S. Rausch of the Lehigh Coal and Navigation Company. — *Ed.*

Down South in Jellico Valley, Tennessee

ITALIAN BLUE GEM COAL CORPORATION
R. R. No. 2, Jellico, Tennessee

The Excavating Engineer September 12, 1928.
South Milwaukee, Wis.

Gentlemen:

Some person or corporation will be pleased to know they can locate South and work with comfort all the year.

Nature has given Jellico Valley and mountains unlimited resources. There are millions of yards of sound marble well exposed, ready for tools and derrick or steam shovel to load. Good iron ore the same.

Millions of tons of good coal can be secured for stripping at low price. Large deposits of fire clay, silica, quartz ore, flint, canal coal, and building sandstone are available. The South has good opportunities for investment. Operators of steam shovels are requested to write for information.

PETER ZECHINI
R. 2, Jellico, Tenn.

The editors of *The Excavating Engineer* have not had an opportunity to investigate Mr. Zechini's claims for Jellico Valley. Readers who are interested can, however, get in touch with him at the above address and obtain more detailed information in regard to the particular operation in which they would be most interested.

FIELD NOTES

Some Things That Mark the Difference Between a Good Operator and a Poor One

By Fred. J. Brewer, *Superintendent of Outside Construction, Bucyrus-Erie Co.*

Editor's Note: For this department, there is in preparation a series of articles of which this is the first, dealing with the care, appearance and maintenance of excavating equipment. It is hoped that these notes will be found of convenience and value to superintendents, master mechanics, operators, and firemen, as well as to others who may be called upon to use or supervise the operation of excavating machinery, particularly those who may not be thoroughly familiar with the mechanical operation of the machines. We realize that there may be several methods of accomplishing the same results, all of which may achieve the desired purpose. But we will endeavor to set forth the method which experience has proved best under average conditions. One set of rules and directions cannot apply in all cases; local conditions and actual operation vary greatly. We always welcome suggestions from experienced field men relative to methods of keeping up equipment or methods of handling operating problems.

General Upkeep

Excavating machinery built by reliable manufacturers is designed and built to move material efficiently, but unless the machine operates continually during the working shift, material cannot be moved at a low cost. The high-grade, experienced operators have no hard and fast rule for the time of shutting down a machine for repairs, except that a machine should not be run if there are repairs needed, which if not made promptly, are likely to cause further and serious damage. However, if there are minor repairs or changes which will improve the operation of the machine, the experienced operator will endeavor to run until nearly lunch hour or quitting time and then make them. An experienced operator will never shut his machine down when it is really not necessary, but always does shut it down promptly when it needs immediate attention. This is a matter of good judgment which the operator has gained by experience and study. His judgment regarding this matter governs, to a great extent, the yardage moved.

Certain parts of the machine which are not functioning properly will be called to the attention of the operator or person in charge. Even an experienced man may try several times to correct the trouble without success. Such a man would then advise the superintendent or general foreman and request his opinion as to what should be done. Under no circumstances would he neglect this matter until the condition became so serious that the machine would have to be shut down for general repairs. The action taken by the operator does not show ignorance on his part — rather it indicates to the superintendent or general foreman that he is interested, and is willing when difficult points arise to request the co-operation of other members of the organization.

An experienced operator generally makes all the necessary adjustments and repairs to the moving parts, and also at regular intervals inspects the permanent connections of the structural parts and castings. He realizes the importance of keeping the moving parts working properly, also the equally important factor that the various bolts and rivets holding the structural members and castings in position, be kept tight. This operator realizes that keeping these rivets and bolts tight will prevent the members from working loose and greatly simplifies the work of keeping the moving parts in proper alignment.

The operator makes his inspection at regular intervals — at least once or twice a month on days when the machine is idle; and if any bolts are found loose they are tightened, or if any rivets are loose they are cut out and redriven promptly. These points are carefully looked after when the machine is assembled, to insure well-connected members. The operator considers it one of his duties to keep these members tight. This duty is quite as important as that of seeing that the moving parts function properly or that the machine is lubricated properly.

The appearance of his machine is a matter of pride with the experienced operator. He instructs his crew to keep the floors and machinery free from oil or dirt which may drip from the bearings, gears or ropes. This will assist in the prevention of accidents. He also finds that he can make the occasional repairs quicker and better. Other rules enforced by the operator are: Repair work must always be done in the proper way — slipshod methods are more expensive in the end. When the repairs are completed, tools and equipment should be placed in their racks and kept clean and orderly. Furthermore, there must be a systematic method devised for keeping track of the tools. It is important that every tool be kept in the place

(Continued on Page 432.)

EQUIPMENT YOU OUGHT TO KNOW ABOUT

New Shovel Cuts Stripping Costs with 50 Per Cent Increase in Production

12-Yard Stripper Has Same Speeds as the Fastest 8-Yard Shovel

When the most important coal-stripping operations are analyzed, it is seen that to make money at the present profit margins, the cost of stripping must be cut even lower than in past years.

The future profits on strip coal are going to be made by the operators who are able to move more overburden per day with the same man-power now used — to uncover more coal at lower costs for machine operation — lower cost for power, as well as lower labor cost.

To co-operate with the progressive coal operators who are looking ahead, and trying to insure themselves a continuation of legitimate profits even under severe competitive conditions, Bucyrus-Erie has worked out a method of stripping off the overburden at a lower cost than ever before possible.

The key to this method is the use of larger stripping shovels, which operate at the same high speed attained with the smaller machines. For example the 12-yard stripping shovel, Bucyrus-Erie 750-B, works continuously at the same speed as the fastest 8-yard shovel — giving a 50 per cent increase in production with no increase in labor expense. And with a lower cost-per-ton for machinery and power.

As such operation of the larger stripping shovel at high speed places a much heavier duty on the entire machine, older shovel designs were discarded in creating the 750-B. While it combines many features which have been developed through years of experience in constructing large stripping shovels, there are a large number of important and very practical new features that years of close contact with strip-pit operation have shown to be advisable for this heavier service.

Outstanding among all these new features on the machine are four developments which make the fast operation and increased production possible. They are: (1) Two separate hoists; (2) Twin swing machinery units; (3) New type of support for the boom; (4) A two-part cast dipper — built without a rivet.

A 12-yard Dipperful at Every Pass — Two Separate Hoists, One on Each Side

Although holding half again as much material as an 8-yard dipper, the 12-yard dipper is only 15 inches wider, so that a heavier cut is needed to fill it at each

The maximum dumping radius of the 750-B is 107 feet. The maximum dumping height is 77½ feet. Its digging reach at 40-foot elevation is 110 feet 3 inches and yet it is capable of handling heavy rock overburden of this nature at a speed equal to the fastest eight-yard electric shovel. The 750-B weighs 1,788,000 pounds, ready to work. This is the largest shovel yet built and the first of this size to be placed in operation. Some idea of the size of the 12-yard dipper may be obtained from this illustration which shows a motor car being driven in the bottom and out of the top of the dipper.

Rock like this will test the stamina of any shovel. The outside dipper sticks of this machine are tied together by means of a flexible truss which permits transmittal of the loads caused by swinging directly to the twin A-frames and yet is flexible enough to allow the twin hoist to take uneven digging loads such as are encountered in rock digging or when digging with one corner of the dipper.

pass. This calls for more powerful crowding by the dipper sticks, and a much greater hoist pull.

The heavier cut and greater hoist pull that is necessary would not be practicable with a single central hoist — as the big dipper would twist or "wobble" in the bank, and unless this big dipper goes up through the bank without wobbling the operator will not fill it — no matter how much bail pull is available.

The fast and steady cut of the deep-crowded 750-B dipper is made possible by two separate hoists, one on each side of the dipper, which run over twin boom sheaves, giving the equivalent of a bail extending up over the boom point and down to the main drum. Each of the two single-part hoists is made up of equalized twin ropes, all wound on one single drum.

Fast Swing, Under Perfect Control — By Twin Swing Units

High-speed swinging, with quick starting and stopping, has been provided in the 750-B Bucyrus-Erie by means of twin swing machinery units, at opposite sides of the gearing.

This swing mechanism gives the operator the same advantage, for fast stopping and starting, as you have when driving your automobile through traffic — when you take hold of the steering wheel with both hands for quick action and perfect steady control.

The swing units of the 750-B start and stop the 12-yard machine as quickly and accurately as the smaller strippers. An added advantage of this design is that the twin swing units divide the stresses and distribute them equally at both sides — relieving the center pintle of the strain that would result from the application of all of the swinging force on one side.

Boom Supported Against Twisting by Double Suspension Tackle

Provision has been made for the handling, at high speed, of the full 12-yard dipper out at the extreme length of the dipper stick. The boom of the Bucyrus-Erie 750-B has been given unique support against the twisting strains set up by starting and stopping this heavy weight at high speed, at a long radius.

The double suspension which is provided gives the 750-B's boom complete protection against the twisting strain. Two sets of fixed suspension tackles support the boom point and, in addition, run to both sides of the boom at the shipper shaft in order to take away from the boom at this point — where they are put in by the handles — the twisting strains caused by starting and stopping the rapidly swinging loaded dipper.

This method of taking the swinging strains direct from the shipper-shaft back to rugged twin A-frames assures trouble-proof performance at high speed.

A Dipper Without a Rivet — For Service in Hard Digging

The 750-B Bucyrus-Erie has been provided with a dipper that matches the digging ability of the machine.

It is cast of special steel and is of a type that has proved most successful in standing years of steady digging in the hardest rock work; it is constructed *without a rivet in it.*

This dipper is divided horizontally, so that the upper part, that takes the wear in hard digging, can be renewed after long service.

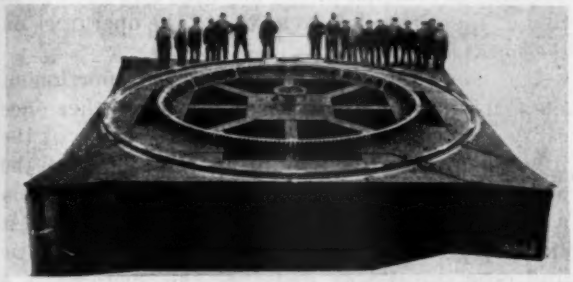
With this construction the digging strains are transmitted through solid steel, instead of through the several assembled units of a built-up dipper.

The need for maintenance work on the front end of the 750-B Bucyrus-Erie has been cut down to the

minimum by the box-girder-type boom and outside or "straddling" dipper sticks.

The twin sticks spread far apart, support the dipper at both sides — instead of only in the center; the tremendous strains of swinging the loaded twelve-yard dipper back and forth at high speed do not tend to pry the boom apart. The sticks are of all-steel construction, and are tied together at the upper and lower ends. The connection at the lower or dipper end takes the form of a flexible truss, which transmits the pull of the swinging loads directly to the A-frame (through the boom suspension cable at the shipper-shaft) but which permits the double hoist to take the stresses of uneven digging, such as are encountered in rock or when digging over only one corner of the dipper.

Because of the outside sticks, the boom does not have to resist the prying apart strains which would



The rugged base of the 750-B supports the revolving frame on a roller circle 34 feet in diameter. This brings the load on the base girders well out towards the point where the caterpillar base supports them. The swing circle upon which the swing pinion acts has teeth upon the outside. This makes possible a stronger tooth and a better distribution of swinging effort.

occur with the inside handle, and which are so serious in a big machine. Thus the boom may be made much lighter than would be possible with inside sticks. Furthermore, the boom is a box girder — which, excepting a circular pipe, is the strongest possible structural form for a given weight. This strong, light boom means light counterweight and a fast swinging machine — one that starts and stops swinging quickly and without unnecessary strain on the whole machine.

The boom is seven feet deep and four feet wide at the shipper shaft. Its cast boom feet, with sockets resting on heavy lugs on the front casting of the revolving frame, provide a firm support, yet one that permits enough motion to avoid excessive strains in boom and handles.

The boom load is distributed to the box girder front member of the revolving frame, and its deep side girders, by two complete A-frames — one on either side of the shovel.

Each of these A-frames is capable of carrying all of the stresses.

The design of the 750-B revolving frame gets away from the distortion and concentrated loads which are the causes of a frame's loosening up, and the machinery losing alignment.

Across the entire front of the 750-B's revolving frame, carrying the front end boom-supporting casting, extends a box-girder *50* inches deep, and *84* inches wide.

From this beam — which supports the boom at its center, the front legs of the A-frame and the sway guys — six great backbone girders extend the entire length of the frame.

Tied together with cross girders, also with secondary members over the swing circle and under the machinery, the completed frame is a dependable unit that will stand up to hard service. Besides doing away with the renewal of rivets which comes from concentrated loads on a frame, this construction makes an important saving in upkeep costs on the operating machinery, which is solidly supported and held in permanent alignment.

The "heart" of the base for the Bucyrus-Erie 750-B is a huge center pipe casting of steel. From this center, extend eight radial beams with a maximum depth of 7 feet 3 inches.

Tying these radial beams together at their outer ends are four outside girders which are fastened to each other and to the diagonal members by corner castings — forming a rigid, unyielding corner.

Under each corner of the base is a complete caterpillar-type mounting unit, composed of two endless traction belts, each forming the track for two tumblers and two rollers.

There are only 27 gears below the deck, three bevel gears at the lower end of the vertical swing shaft and three for each of the eight caterpillar belts.

By means of an equalizer beam and electrically driven jack screws, the base is supported on three points for moving up and under each corner while digging. This enables the machine to move over and to work upon uneven ground without any elaborate, complicated devices which court trouble.

The two units on one side support the base directly through a heavy, single-casting pedestal.

On the opposite side, the two units support the ends of an equalizer beam, at the center of which the base rests on a flexible support.

At each end of this beam is an electrically-driven jack-screw, which is backed away from contact with the base while propelling, but is turned up to provide a firm support for the corner while the machine is digging.

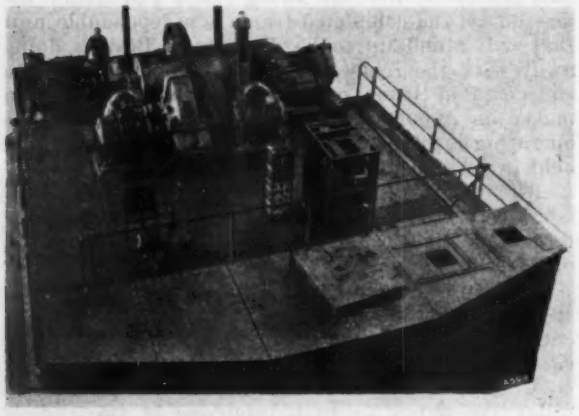
In this way the base is supported at three points only while propelling. But when digging, it is rigidly supported on all four corners.

Each of the units may be propelled at either high or a low speed, so that the shovel can propel itself in an arc of surprisingly small radius.

There are no brakes and clutches used to control any of the motions on the 750-B.

Throughout the cycle, the control is entirely electrical.

Return of the dipper to the pit is fast and smooth,



This is all there is to the machinery on the revolving frame of the 750-B. It is complete except for the removal of the motor-generator set and the auxiliary electric winch.

the electric regenerative braking being positive and accurate.

All digging motions are governed by three small easily working electric controllers in front of the operator — two worked by hand and one with the feet.

This control is due to the use of Ward-Leonard direct current field control, with separately excited shunt-wound motors.

Two motors, four gears, a drum, a safety friction, and two holding brakes comprise the main machinery of the Bucyrus-Erie 750-B.

Two 250 horse power motors drive through the first herringbone gear reduction, which is enclosed and running in oil.

As on the main machinery, so on the crowd there are only two gear reductions driven by a 100 horse power motor.

Some Things That Mark the Difference Between a Good Operator and a Poor One

(Continued from Page 428.)

designated for that purpose, to the end that the crews on the other shifts will know where to find these tools. He also insists that the machine in general, the condition of the fire and water, as well as the position of the machine and the condition of the pit, be left so as to aid the operators on the night shift.

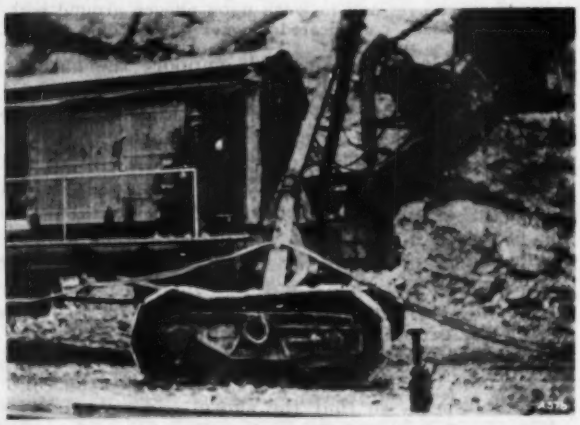
He finds it advisable to paint that portion of the machine which is exposed to the weather once every year or two to prevent deterioration of the iron or wood. Such painting will improve the appearance of the machine. The first impression a visitor obtains of a neat appearing machine, is that the work is being carried on in a systematic and economical way and that the operator is a high-grade efficient man.

SHOTS FROM THE FIRING LINE

Australia Notes

BY W. J. ATKINS

Operator W. J. Atkins sends us the photographs which illustrate this article, from New South Wales, Australia. Mr. Atkins is operating a 103-C Bucyrus electric railroad-type shovel in the Kandos Cement Company's quarries. One



W. J. Atkins with His Son on the Running Board of the Bucyrus 103-C Electric Which He Operates in the Kandos Quarries.

of the views shows the firing of a large blast in front of the 103-C. 125,000 tons of limestone was dislodged.

Blast Dislodging 125,000 Tons of Limestone.

New York Notes

Announcement of the award of contracts for construction work on three bridges to be operated by the National Toll Bridge Company has been made by J. G. White & Company, bankers for the company. The contracts that have been let are those for the substructures of the Herman Bridge over

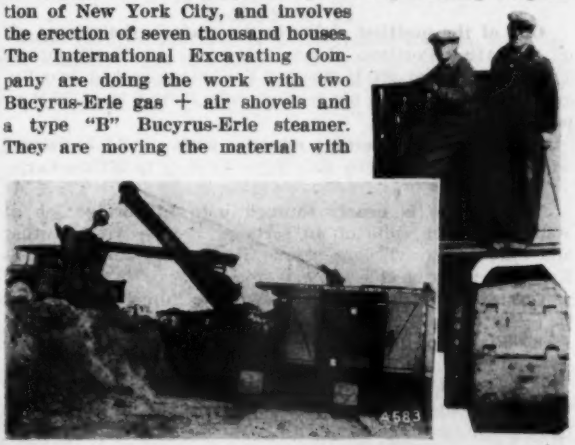
SHOTS FROM THE FIRING LINE — Continued

the Missouri River at Hermann, Missouri to the Foundation Company of New York; the Madison Bridge over the Ohio River between Madison, Indiana and Milton, Kentucky to the Vang Construction Company of Pittsburgh, and the Independence Bridge to be erected across the Missouri River near Kansas City to the Union Bridge and Construction Company of Kansas City. Plans for all three bridges have already been approved by the Acting Secretary of War.

New Jersey Notes

BY HARVEY E. REED

The International Excavating Company of Newark, New Jersey, has recently started work on a large housing project near Paterson, New Jersey, to be known as Radburn. This development is being projected by the City Housing Corporation of New York City, and involves the erection of seven thousand houses. The International Excavating Company are doing the work with two Bucyrus-Erie gas + air shovels and a type "B" Bucyrus-Erie steamer. They are moving the material with



six "iron mules," three nine-yard Western crawler dump wagons and a fleet of pneumatic trucks. The picture shows one of the gas + airs at work cutting an eighty-foot roadway. This machine is manned by Christy Quinn and his brother James, who are shown in the closeup, with Christy at the levers.

Canada

Montreal and Vicinity

BY J. M. WARD

Mr. Ben Bate, who was recently on the engineering survey for the new Beauharnois Power Canal, is now connected with Gorman and Peckham on their Visitation Island Job.

The Canadian International Paper Co. are proceeding with their big project at Campbelton, New Brunswick. The work is being carried on by The Domill Construction Co.

We had a visit from C. E. McDougal of McDougal Bros., Ottawa. They are tendering on some work in the East.

Another caller was Mr. Wm. Cooke, of Halifax, at present engaged in highway work in Nova Scotia.

Frank Noss is operating a Bucyrus-Erie GA-2, and Bill Norman a 20-B, for Gorman and Peckham at the Visitation Island job.

Dan Verochio's Bucyrus-Erie shovel is excavating founda-tions in Montreal.

Duranceau and Duranceau are using their Bucyrus-Erie on street paving work in Montreal.

Quebec Notes

At the requests of the mining operators in the Cadillac-Malartic-Fourniere area, the Provincial Government, Province of Quebec, has decided to construct a road in that district. Engineers of the Provincial Highways Department, Parliament Buildings, Quebec, Quebec, are now making surveys for a road from Amos to the Malartic Mine in Fourniere township by way of La Motte. This will call for 15 miles of new road. Hitherto properties in this region have been dependent on the water route in summer as a means of communication.

Toronto and Vicinity

Hill-Clarke and Francis of New Liskard, Ontario, are keeping their shovel busy on basement excavation in Rouyn, Quebec.

The Hollinger Consolidated Gold Mines, Limited, are using their 50-B electric shovel for digging gravel, which is being used to backfill their old stopes.

Bonvivere Construction Co., Ltd., have a shovel working on grading the approaches at Lambton Mills Bridge for which the Nelson River Construction Company, Limited, have the general contract. They also have two shovels on grading for the Toronto Transportation Commission work on the Lake Shore Road.

Toronto Notes

BY J. N. JORDAN

On a recent move the Dominion Contracting Company of Toronto, Canada, ran a 50-B Bucyrus steam shovel up on a flat car and hauled it to its new destination — a distance of

nine miles. Moving of the machine was in charge of L. Murphy, the operator was W. R. Copeland and the fireman, W. A. Guam. The method of handling is well illustrated in the accompanying pictures.

Quaker Notes

On a large real estate development job on the Roosevelt Boulevard in North Philadelphia the Frank Mark Contracting Co. are moving 150,000 yards with four type B's. They are hauling with four trains of three and four-yard Westerns with Vulcan gas locomotives; a fleet of Linn tractors and a fleet of pneumatic three-ton Mack trucks.

Jafolla & Mark, Inc., are building a main trunk sewer on the same development through this division, and are using five B's and B-2's for excavating and placing concrete.

The Jas. F. Nolen Co. have one B and one B-2 on this job. The total yardage involves approximately 400,000 yards. The eleven Eries on this job would gladden the eye of any contractor.

The M. R. Aldrich Co. has a one-mile highway job outside of Shamokin which calls for about 50,000 yards of excavation.

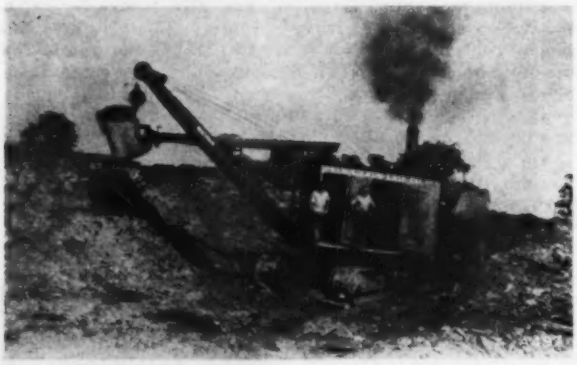
SHOTS FROM THE FIRING LINE — Continued

Mr. Aldrich reports that his GA2 is moving consistently 700 yards per day.

E. Riley Mixner Co. of Goshen, New Jersey, are doing a ten-mile job between Point Pleasant and Seaside Heights on the Atlantic Coast. They have one Type B and one GA2 on this job.

Versaggi Bros. Construction Co. of Wildwood, New Jersey, are doing the sewer and pipe line work on this job, on which they have their two Bucyrus-Erie machines.

Pennsylvania Notes



Jack Clegg, operator, sends us the above picture taken on a job of the Rankin Construction Company of Uniontown, Pennsylvania. Jack was then operating their Bucyrus-Erie B-2 steam, and says about the shovel, "This was the best machine I was ever on." He is also highly complimentary about his fireman, John Dixon, who, he says, is the best that ever stepped on a machine. The superintendent on this job is Harry Huff.

Northeastern Pennsylvania

BY D. W. EVANS

Pat Rienzo has been putting in several blocks of street repairing in Mount Carmel. He is very much pleased with the Type B Erie he bought last May.

George Cooper is stripping and loading coal for the King-ston Coal Company at Plymouth. Pat Egan is running a traction wheel Erie on this job, and Cooper's superintendent says he handles 50 per cent more than any other man on the job.

Had a nice visit with Earl Harrington of the Scranton Contracting Company. They recently bought a Bucyrus 70-C on caterpillars from Rhodes of Ashland to chunk out a stripping job for the Hudson Coal Company near Wilkes-Barre.

One of the prettiest sights in the state is the quarry pit of the Atlas Portland Cement Company at Northampton. Three new 3-yard 100-B Bucyrus-Erie electrics and two Bucyrus railroad shovels are loading rock there with a 50-B on top stripping.

Chris Totton is working miracles with an old horizontal crowd Thew at the Kelly Run Stone Quarry in Wilkes-Barre.

Walter Rae is nearly through with his bridge job at Wilkes-Barre in spite of all sorts of trouble with weather and high water. Thompson and Hasson are running Rae's Erie Gas + Air on this job, and from the way those machines move around you might think they were Fords.

8200 yards of hardpan and clay in five weeks with a little Type A Erie on a high school athletic field is some yardage. P. S. Canfield of New Philadelphia was superintendent on the job. Henry Smith runs this shovel for Canfield, and you don't often see a runner as fast and smooth as he is.

A SMOOTH FIRM GRIP

No jerking or grabbing with *Asbesgraphite!* On shovels, dredges, draglines, cranes, hoists, pavers, trucks, etc., this Gatke product has proved its ability to give longer life, trouble-free service, and ability to speed up operations because of better and smoother control.

Asbesgraphite is a self-lubricating, non-scoring asbestos friction material unaffected by heat, cold or moisture.

It ends friction troubles.

You are missing a bet if your machines are not Asbesgraphite equipped. The cost of a trial installation is negligible. It's not an experiment, for we guarantee satisfactory service—*order today.*

It is not Asbesgraphite unless it is marked "GATKE"

We also manufacture Asbestos Brake Lining in any width, thickness or length

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In writing to Thomas L. Gatke please use post card bound in the center of this number.

SHOTS FROM THE FIRING LINE — Continued

Max Aldrich of Harrisburg has a Bucyrus-Erie Gas + Air on a road job at Shamokin in a tough bit of rock excavation. With W. B. Tucker at the levers it isn't surprising that they have been moving 700 yards a day in this tough going.

O. P. Bell Construction Company of Sunbury, Pennsylvania, bought a Bucyrus-Erie Gas + Air for their state road job in Lycoming County. Tom Saylor who bossed the grading on the Northampton County job is to have charge of the new machine.

Tom Sweemey is running a new 1¼-yard Marion Model 450 gas-electric shovel for George Hess of Drums, Pennsylvania, on a 200,000-yard fill job for the Lackawanna Railroad at West Nanticoke.

Indiana Notes

Jess Lathrop, operator of Terre Haute, Indiana, sends us this snapshot from his album. It shows Jess and his wife on the running board of a Bucyrus Class-14 dragline back in 1924 while the machine was being overhauled at West-

phalia, Indiana, after having moved 290,000 cubic yards of dirt on levee work. The dragline belonged to Hart & Hart, and, as you may notice, another Bucyrus dragline standing alongside was being overhauled at the same time.

Birmingham Notes

BY R. S. WELFER

J. J. Baxter is handling a variety of jobs in Jackson, Mississippi, with his D-2 Bucyrus dragline. At present he is straightening a creek channel.

The Merrill Engineering Company have considerable pav-ing on hand in Jackson, Mississippi.

Sam B. Boyd, Columbia, Mississippi, keeps busy on high-way jobs in the southern part of the State.

I. A. Wright, Tupelo, Mississippi, formerly with the State Highway Department, opened a new subdivision in Tupelo, and is now on a small piece of railroad work east of there.

S. M. Spooner, operator for Atlas Portland Cement Com-pany at Leeds, Alabama, called at our office.

J. D. Liles has rolled up some big yardage for Breland & Myers on their Etowah County job in Alabama.

Detroit and Vicinity

BY P. M. RICHARDS

On Thursday, September 20th, the Michigan Municipal Contractors Association held their 4th annual banquet at the Hotel Statler in Detroit. About one hundred and fifty members and guests enjoyed the banquet and enthusiastically received the speakers. Carl S. Barry, president of the Associated Building Employers of Detroit and vice-president of the General Builders Association acted as toastmaster. S. A. Healy, prominent Detroit contractor and president of the Michigan Municipal Contractors Association gave the address

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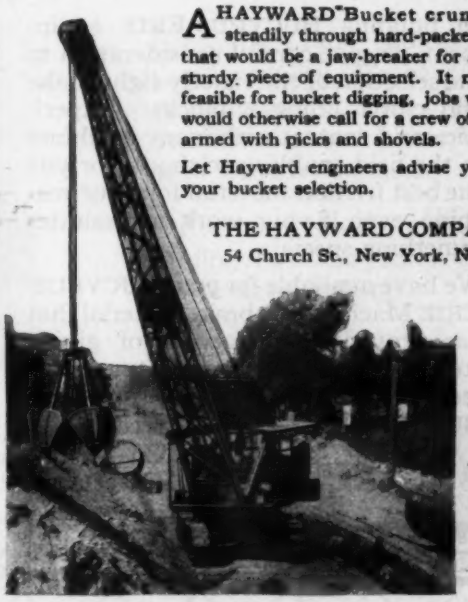
NIAGARA FALLS, NEW YORK

Hayward Buckets

Hard packed soil dug by a Hayward



A HAYWARD Bucket crunches steadily through hard-packed soil that would be a jaw-breaker for a less sturdy piece of equipment. It makes feasible for bucket digging, jobs which would otherwise call for a crew of men armed with picks and shovels.

Let Hayward engineers advise you in your bucket selection.

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SHOTS FROM THE FIRING LINE — Continued

of welcome, and was followed by O. B. Coblentz, president of the McLean Contracting Company of Baltimore, Maryland, C. W. Angle, president of the Angle-Blackford Company of Greensboro, North Carolina, E. J. Harding of the Washington Staff of the A. G. C., V. P. Loftis, secretary of the Carolina Branch of the A. G. C., James J. Reading, of the Municipal Contractors Association, and John W. Reid, Commissioner of Public Works. Interesting talks on the subject of "Building Up Industry" were given by Perry A. Fellows, city engineer, O. A. Montgomery, of the Credit Men's Association, W. H. McBryan, of the U. S. F. & G. Co., and M. R. Hunter, of Hunter Machinery Company. The final address was given by L. L. Broderick of the McCurdy Coal & Supply Company. The officers and directors of the Michigan Municipal Contractors Association are: S. A. Healy, president; John S. Ventrelle, vice-president (Detroit Drainage Construction Company); Ray D. Baker, secretary; F. G. Jeynes, director (Jeynes & Son); and E. J. Early, manager. The Reception Committee for the banquet were as follows: Charles R. Lennane, Hugh McLean, Domonic Gargaro, Henry Ianni, James J. Reading and Remi Coolsaet.

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In building BUCYRUS-ERIE equipment, we give careful consideration to the selection of the exactly right brake and clutch lining or blocks. Experience and contact with many machines in the field enable us to choose for you the best friction material for your machine, even if your work necessitates something special.

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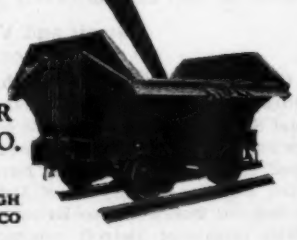

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SHOTS FROM THE FIRING LINE — Continued

J. A. Mercier Company are repaving Seven Mile Road east.

S. A. Healy Company will complete Sections 2, 3 and 4 of the Rivard Sewer within a short time. They have made a new record for sewer construction in Detroit on this job.

The Woodward Construction Company are using one of S. A. Healy's Bucyrus-Erie 50-B machines on Lascher Road near Puritan.

George R. Cooke Company are widening Woodward Avenue through City of Birmingham.

Laramie Brothers have completed a dragline job at Whitmore Lake with their 1030 machine, and have moved it to Pontiac, Michigan. Laramie Brothers now own eighteen Bucyrus-Erie machines.

Oliver J. Truckau was low bidder on Detroit Water Board job on October 10th.

Chicago and Vicinity

BY R. H. BEDWELL

I. J. Weaver, who has for the past several years been an electrical engineer for the Gayle Coal Company, has recently severed his connection and is now with the Allen and Garcia Company, consulting engineers of Chicago. He is on outside construction and is at present at Pennsylvania on a large tipple job.

Isaac Rosen stepped into a corner grocery store.

"I want some pepper," said he to the lady clerk.

"What kind do you prefer, black or white pepper," she replied.

"I don't vant eder kind, I vant tissue pepper — — —."

Here the Track Machine is taking the place of a jack crew, raising the track on a railroad construction job.

Raising Track Without Jacks

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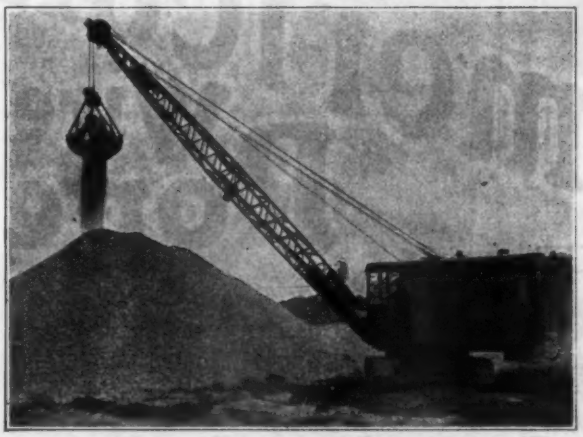

Browning Crane, equipped with a Twin City 7¾x9 4-cyl. engine handling crushed rock. It has handled as high as 55 tons in fourteen minutes.

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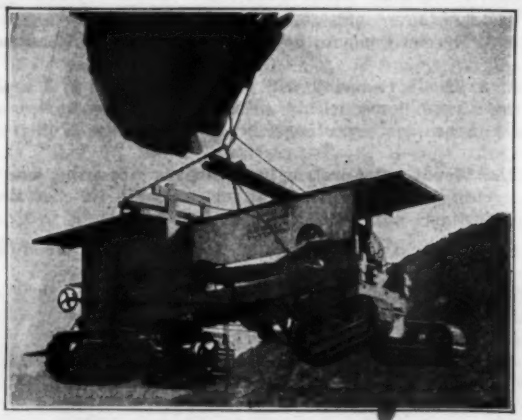
SHOTS FROM THE FIRING LINE — Continued

Wisconsin Notes

BY E. P. DOYLE

Richard E. Meyers Construction Company are doing grade work out at the A. O. Smith Corporation, Milwaukee, with their B-2 and Gas + Air Eries. They have just finished 18,000 yards of grading work. Joe Paulson is operator on the B-2 and Bud Lipcomb is the fireman. Joe Weber is at the levers of the Gas + Air. Thomas Eoron is the boss on this job. Part of the work consisted of grading an athletic field. Here the Gas + Air did a wonderful job of finishing, leaving a surface level as any floor. One man did all the hand work



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For hard drilling and fast drilling the "CLIPPER" can't be beaten. The holes go down and your drill footage goes up hour after hour, day after day, month after month. The machine, exceptionally fast, is even more remarkable for the sturdy stamina and special features of construction which cut down delays and save you money. *Write us for information.*

THE LOOMIS MACHINE CO.

(Established 1842) K Street, Tiffin, Ohio

SHOTS FROM THE FIRING LINE — Continued

behind the shovel. Large capacity caterpillar wagon trains were used behind Caterpillar tractors.

Here we have a 20-B Bucyrus steam shovel tearing up the old roadbed along Superior Street just after you enter Milwaukee on Highway 15. The White Construction Company

have the contract and are building the new road. L. L. Newkirk is the superintendent and he tells us that the 20-B is the best he has ever seen. A. Sevanson is the operator and A. Wilson, fireman.

Mechanico Professor: "Describe the mechanism of a steam shovel."

Frosh Engineer: "Don't kid me. You can't carry steam on a shovel." — *Oklahoma Whirlwind.*

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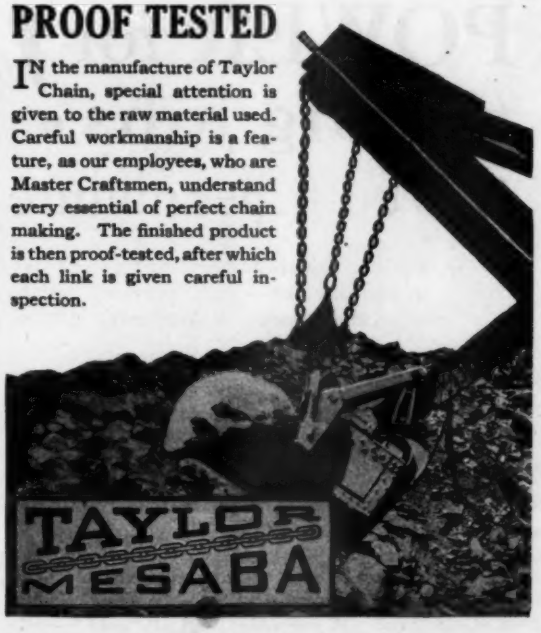

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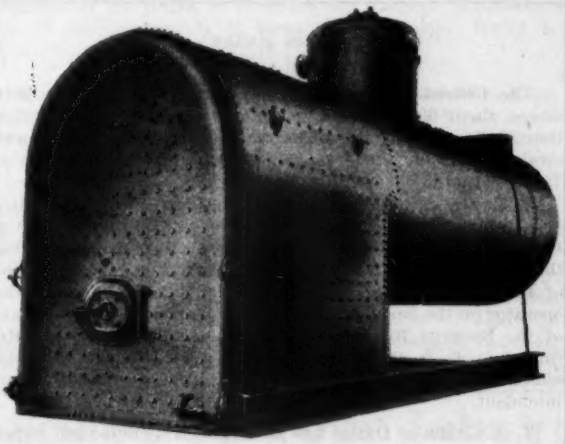

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Specializing in Boilers for Contractors' Equipment

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SHOTS FROM THE FIRING LINE — Continued

Texas Notes

BY GEORGE A. CARLSON

The Gifford-Hill Company, Inc., of Dallas have to date moved about 900,000 cubic yards of material on their Cotton Belt Railroad contract which involves grade revision and straightening of line from Mount Pleasant to Big Sandy. This work is under the direct supervision of H. M. Dodds.

E. B. Hill, brother of the Vice-President J. Rutledge Hill, is superintendent of one of the shovel camps. He has a Bucyrus-Erie E-2 Diesel shovel with J. C. Marchbank handling the levers most of the time. H. M. Forrest is superintendent of the Bucyrus-Erie 50-B shovel outfit. Jim Hinson is the operator on the Bucyrus 50-B. Porter Harrison is at the levers of the Bucyrus 70-C which is under the supervision of Mr. Sullivan. E. B. Patrick has charge of the Marion 60 outfit, which Buckmaster is running. E. Willis is equipment superintendent.

T. A. Griffin of Dallas has an Osgood 1¼-cubic-yard steam shovel on the same work. Albert Holman is in charge of Mr. Griffin's outfit.

W. H. Nichols is another subcontractor on the same work, using a Link-Belt 1-yard gasoline dragline.

C. E. Van Orman of Yoakum, Texas, formerly of Lee and Van Orman, gravel producers at Westpoint, Texas, is just completing his crushing plant at his new quarry at Hartshorne, Oklahoma. R. E. Koep is his superintendent. Koepp was formerly superintendent of the Chico Lime Products Company.

Mr. Hickman, who formerly operated the Bucyrus-Erie 20-B Diesel dragline for the Hidalgo County Water Improvement District No. 2 has been made superintendent of their dragline operations since the start of their big drainage program. A Van Dresar is general manager of this district and C. D. Cramer, assistant manager.

Trinity Farms Construction Company of Dallas now have four Monighans working on the Trinity River reclamation project at Dallas.

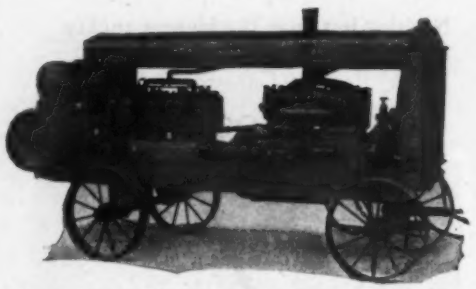
Captain Crawford, better known as "L. D.", is now flying his own aeroplane. Jack Brooks of the Brooks Construction Company and J. F. Dexter of the Dexter Construction Company, both of Dallas, are other well-known contractors who are also using this modern method of getting around to their jobs and looking over prospective work. They both fly their own ships.

J. R. Utt, who until recently has been operating one of W. T. Montgomery's D-2 Diesel shovels at Mission, jumped clear up to Quitaque to help out Roberts Brothers complete their ballasting on the Fort Worth and Denver extension.

August Beck, president of A. H. Beck & Company, had his Erie B steam shovel working night and day digging the basement for the new Plaza Hotel garage in San Antonio. His brothers, Amos and Amil, took turns about superintending the different shifts.

Mr. Lautenslager is operating the 1-yard Marion for the Abney Gravel Company of Mission. This machine has been changed over from a gas-electric to a straight electric machine.

Tibbetts Construction Company are busy at work on the many contracts which they secured at the last September letting of State Highway Department. Frank Ashburne, son of J. W. Ashburne, president of Tibbetts Construction Company, is superintending the big dirt job in Henderson County. Their 30-B Diesel shovel is being used on this work. J. W. Matthews is looking after the contract near El Paso, and Mr. Butler's son is in charge of the paving near Huntsville.



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Schramm Inc., Manufacturers

West Chester, Penna.

Offices and Representatives in Principal Cities.

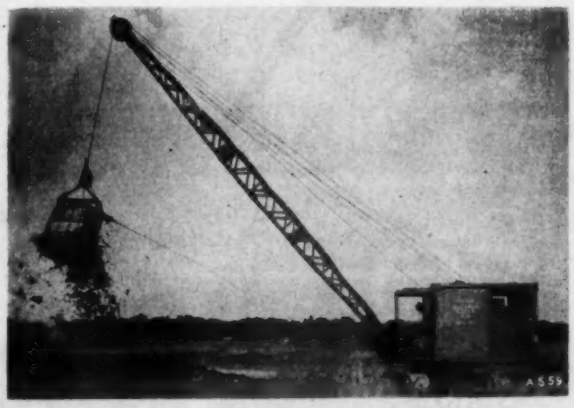
In writing to Schramm, Inc., please use post card bound in the center of this number.

SHOTS FROM THE FIRING LINE — Continued

Scott Mitchell of the Flick Construction Co. was a recent visitor. He reports that their work on the Santa Fe Railroad at Pampas, Texas, is progressing very nicely.

Minnesota Notes

BY E. P. DOYLE



One of two Bucyrus-Erie "1030" machines now operated by the Dunkel Construction Co., Webster City, Iowa, starting the excavation for an artificial lake at Minneapolis, Minnesota. In five hours, this machine with its ¾-cubic-yard dragline bucket, moved 600 cubic yards of silt and gravel, often working in water. It is excavating the soft swamp to 8 feet below surface.

St. Louis Notes

BY H. H. BUCHANAN

H. A. Kavanagh, one of the best operators in this neck of the woods, is on the job for the City of St. Louis Water Division. The City's Bucyrus-Erie Type "1030" crane or dragline is digging trenches and laying thirty-six inch bell and spigot pipe. In the illustration Mr. Kavanagh is shown at the levers, with Service Engineer Elva Belding on the corner of the cats.

St. Louis Items

BY A. J. KOENIG

Secretary of State Emmerson, of Illinois, issued a charter to the Chicago and Illinois Valley Railroad Company. The company will construct and operate an electric railroad from Joliet through Princeton and from Ottawa to Streator. The members of the board of directors are Clement Studebaker, Geo. T. Buckingham, L. E. Fisher, H. L. Harley, Henry L. Green, E. W. Fowler and D. H. Holmes.

Keating Bros. have their outfit at work on a state highway grading job in White County, Illinois. P. J. McGraw has a subcontract and is doing some fresno work for Keating Bros. on this work.

M. D. Bagwell & Son have finished their work for J. Kreis & Son, at Gray Summit, Missouri, and have two draglines idle. They would like to get some work for their outfits. Mr. Bagwell can be reached at Gray Summit, Missouri.

The State Division of Highways at Nashville, Tennessee, will receive bids for approximately $3,000,000 of highways and bridges about October 26. The improvement calls for 112 miles of grading and three special bridge projects.

Speed Up Your Jobs with a MOON!

MOON Tu bo Generators
1 to 4 KW.

THERE are no night-time delays with a MOON Lighting Plant on your job, because they are built for steady, continuous service.

Write for Catalog No. 5. It tells why.

THE MOON MANUFACTURING CO.
108-128 No. Jefferson Street, CHICAGO

GASOLINE PLYMOUTH LOCOMOTIVES DIESEL

The **PLYMOUTH**
LINE OF GASOLINE AND DIESEL LOCOMOTIVES IS COMPLETE FROM 2 TON TO 50 TON SIZES

TIME IS THE TEST. IT'S THE SAVING IN OPERATION COST THAT COUNTS.

PLYMOUTH LOCOMOTIVE WORKS
The Fate-Root-Heath Company
277 Riggs Avenue PLYMOUTH, OHIO

Where weight counts most

Time and again you see WILLIAMS Buckets dig in and stand up in work that stops other buckets, because—

The WILLIAMS is more ruggedly constructed throughout — with the weight not simply hung on, but built right into the bucket where it adds Strength and Durability as well as Digging Power.

Write for our Bucket Book.

G. H. WILLIAMS COMPANY
603 Haybarger Lane, Erie, Pa.
Branch Offices:
New York Pittsburgh Cleveland Chicago

WILLIAMS
FAST-DIGGING BUCKETS

SHOTS FROM THE FIRING LINE — Continued

J. B. Dorris, Sardis, Mississippi, has a machine outfit and eight teams idle. He is looking for a grading job.

A. L. Cook, Ottawa, Kansas, have contract for the grading of 5.06 miles of highway at Smith Center, Kansas.

Illinois still continues with her heavy roadbuilding program. At the last letting contracts amounting to over $2,000,000 for roads and bridges were awarded.

W. D. Kelly, Canton, has a steam shovel idle that he would like to place on some work, either on subcontract or will lease by the day. Anyone interested can get in touch with Mr. Kelly at Dunn Avenue, N. W., Canton, Ohio.

Construction of the new railway and highway bridge across the Illinois River three miles north of Grafton will begin next month, and will be completed by the time the farmers of Calhoun County, now without a railroad or bridge, begin the shipping of their next apple crop. The bridge will be of concrete and steel, with a revolving draw. It will be 2700 feet long with a 12-foot roadway on each side of the single railroad line. The cost is estimated around $700,000, of which $250,000 is pledged by the farmers and merchants of Calhoun County, by a tax of twenty-five cents on each barrel of apples shipped. The promoters also plan the construction of a railroad through Calhoun County from Grafton to Quincy, about 95 miles, at a cost of $8,000,000.

A contract for the construction of a concrete highway two miles west of this city was awarded by the County Court to Clyde Israel, Clayton contractor, on his low bid of $68,948. This bid was $11,132 less than the engineer's estimate. Nine bids were received, all of which were under the estimate of the county engineer.

Oregon Shots

BY OSCAR B. BJORGE

J. C. Papin has just about cleaned up the 70,000-yard subcontract on the Coyle Construction Company's North Bank Highway at Prindle, Washington. Old timers will remember that Mr. Papin was for many years a steam shovel operator for the Coyle Construction Company. They will also remember Mr. Papin as a real go-getter, and will be pleased to hear that he is making good on his new venture. Mrs. Papin, a very fine companion and a real help-mate, is right on the job with him as usual.

Utah Notes

BY EDWARD P. HERMANSON

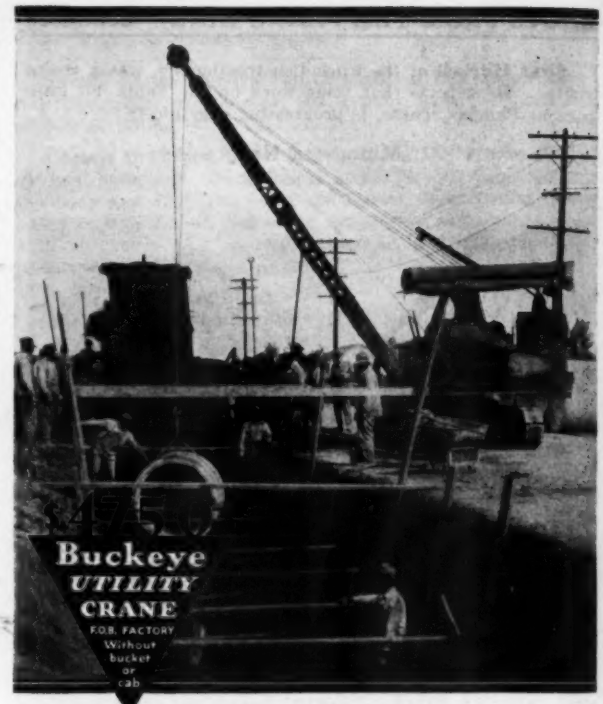
If sales of the type covered by the following advertisement were held in this day and age, I am sure that there would be no trouble in getting a larger number of bidders. The old sale bill now in the collection of the Old Oregon Trail Association reads as follows:

"Having sold my farm and am leaving for Oregon Territory by ox team will offer on March 1st, 1849, all of my personal property, to-wit: All ox teams . . . one 60-gallon soap kettle, 85 sugar troughs made of white ash timber . . . two spinning wheels . . . 100 empty barrels, 32-gallon barrel of Johnson-Miller whiskey 7 years old, 20 gallons apple brandy, one 40-gallon copper still, . . . six head of fox hounds, all soft mouthed except one. At the same time will sell my six negro slaves, two men 35 and 50 years old, two boys 12 and 18 years old, two mulatto wenches 40 and 30 years old, will sell all together to same party as will not separate them . . . My home is two miles south of Versailles, Kentucky, on McConn's ferry pike. Sale will begin at 8 o'clock a. m. Plenty of drink and eat."

Pacific Notes

BY R. L. PIERSON

Contracts were recently awarded as follows by the California Division of Highways, Highway Building, Sacramento: San Bernardino County — To Dillon & Boles, 118 North



Entirely served the purpose!

EXCEPTIONALLY pleasing performance must be given by equipment to enthuse an owner to commend it so strongly as the Columbia Construction Company does their Buckeye Utility Backfiller-Crane, in these words:

"This machine has been very satisfactory and has entirely served the purpose for which we ordered it.

"Previously, we did not have any light-weight, full-revolving crane which would easily cross a newly filled ditch or work near the edge of an open trench.

"It is now working on sewer installation. We have been using it to lower 48-inch concrete pipe, also as a crane to handle a ⅜-yard clamshell bucket and as a backfiller."

Road, street and general contractors find this rugged little full-revolving Crane highly profitable for many odd jobs for which heavier and less adaptable equipment is not economical.

You can buy this Buckeye, with its diversified working ability as Backfiller, Clamshell, Crane, Ditcher, Dragline and Truck-Crane, for $4,750 f. o. b. factory, without bucket or cab. It pays for itself quickly — *out of the savings it makes.*

Check its specifications, operations and maintenance from our Crane Bulletin which will be sent on request.

The
Buckeye Traction Ditcher Company ~ Findlay, Ohio

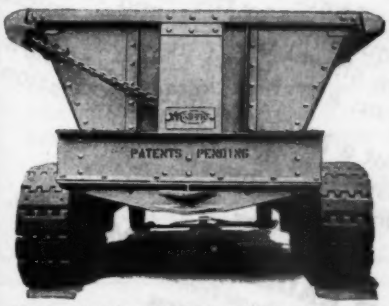
There's a Buckeye Sales and Service Office Near You

for over thirty years **Buckeye**

In writing to The Buckeye Traction Ditcher Co. please use post card bound in the center of this number.

A line-up of seven of the eight Western Crawler 7-yard Dump Wagons at work on this job.

Can You Finish Your Work Before Cold Weather?



The rear drawbar of the Western Crawler Dump Wagon is a heavy steel casting to which a second wagon can be hitched when it is desired to operate the wagons in trains. This rear drawbar casting is now standard equipment.

EQUIPPED with Western Crawler Dump Wagons your outfit can finish before the freeze-up. By working night and day you can get out a month's work in two weeks' time. You will not be troubled by the poor haulage conditions of late fall. The Western Crawler Dump Wagons, on their broad Athey Wheels, will carry their huge loads under any conditions where a crawler tractor can operate.

If there is any question of a loss through not finishing your contract this season, Western Crawler Dump Wagons can help. Bulletin 28-GE gives the facts. *Write at once.*

WESTERN WHEELED SCRAPER COMPANY
AURORA, ILLINOIS

WESTERN

Western

DUMP CARS AND GRADING EQUIPMENT

In writing to Western Wheeled Scraper Co. please use post card bound in the center of this number.

SHOTS FROM THE FIRING LINE — Continued

Crescent Heights Boulevard, Los Angeles, who bid $264,235 on the basis of road mix for 21.4 miles of grading and gravel or stone surfacing from Daggett to 4 miles west of Hector. Engineer's estimate was $297,672. San Bernardino County — To Bert Calvert, Architects Building, Los Angeles, who bid $25,975 for 5.4 miles of grading from Needles to Topoc. Engineer's estimate was $38,970. San Diego County — To Nevada Contracting Company, Fallon, Nevada, who bid $99,803 for 3.9 miles of grading Guatay Creek to Pine Valley Creek. Engineer's estimate was $91,251.

Plans and specifications are being completed by Consulting Engineer S. J. Norris, Oroville, Butte County, California, call for bids to be issued in about two months for the construction of the Webber Creek Dam, to be earth-fill type for the El Dorado Irrigation District, Placerville, El Dorado County, work involving 1,000,000 cubic yards earth fill. Bonds voted $1,800,000 for the above work and for the construction of conduit, siphon, tunnel, concrete lining, ditch enlargement and other works, bids for which will be called for later.

The Imperial Irrigation District, El Centro, Imperial County, California, is considering holding the following bond elections: $1,800,000 for extensions to the drainage system. $1,700,000 for the construction of several small power plants. M. J. Dowd is chief engineer of the Imperial Irrigation District.

It is reported that the State Highway Department of California has at the present time the largest reserve fund ever known in the history of the Highway Department for new construction. It is estimated that at the present time there is between twenty-seven and thirty million dollars unappropriated for new work. This indicates that 1929 is going to be a bumper year in the Highway Department. This money has been secured through the extra one cent gas tax now in force in the State of California.

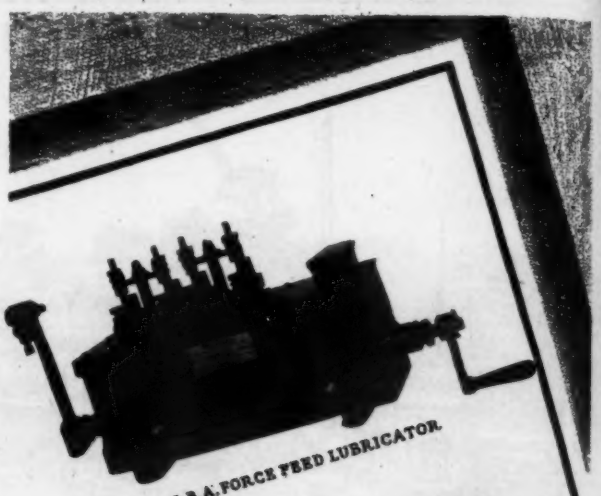
Glenn Kibbe of Kibbe & Kern, Portland contractors, received a contract from the United States Government for 300,000 tons of rock for the Crescent City breakwater. Glenn Kibbe, who is recognized on the Pacific Coast as an expert in rock work and building of breakwaters intends to use a 50-B steamer in the handling of the rock in the Trinidad quarry for this contract.

It may be of interest to some of the old timers to learn that upon the arrival of Erector Alva Belding from the East the old cook, who was formerly employed by Twohy Brothers at Orofino, met him at the train at the Oakland Mole and presented him with two onions as a safeguard against any bears that he may meet in Lake County.

TRADE NOTES

The Motor Power Equipment Co., Ford Road and River Boulevard, St. Paul, Minnesota, has been appointed a distributor for the Trackson Company, Milwaukee, Wisconsin, and will handle all Trackson lines of equipment for the McCormick-Deering industrial tractor. They will also be able to give prompt service on repairs and replacements for Trackson full-crawlers, loaders, shovels, cranes, etc.

The National Paving Brick Manufacturing Associations, formerly located at 332 South Michigan Avenue, Chicago, Illinois, have moved to the National Press Building, 14th and F Streets, Washington, District of Columbia, in order to keep in closer touch with various governmental bureaus and national associations.



BETTER LUBRICATION MEANS BETTER PERFORMANCE

A McCord force feed lubricator installed on your steam shovel now will insure more continuous operation. Dependable force feed lubrication prevents shutdowns and delays, it gives more hours on the job.

McCord force feed lubricators are used as standard equipment by the largest and best-known steam shovel builders, and they will be installed on any shovel at your request.

Put a McCord lubricator on now and be assured of dependable lubrication for the life of your shovel.

McCORD RADIATOR & MFG. CO.
Lubricator Division
DETROIT, MICH.

McCORD FORCE FEED LUBRICATORS

TRADE NOTES — Continued

The Erie Steel Construction Company of Erie, Pennsylvania, manufacturers of steel bins, volumemetric and weighing aggremeters, clamshell buckets, overhead traveling cranes and complete storage yard installations, have opened their own office in Chicago, Illinois. Mr. O. H. Watson, a competent engineer, is in charge of sales and service at this office, which is located at 205 West Wacker Drive, Chicago, Illinois.

BOOK REVIEWS

We shall be glad to review such books and catalogs as are sent us

NEMA HANDBOOK OF APPARATUS STANDARDS — 17th edition, 1928, 348 pages. Published by the *National Electrical Manufacturers Association, 420 Lexington Avenue, New York City.* Price $3.00. The book embraces standards of electric power, control and measuring apparatus for the generation, distribution and utilization of electric energy. Each section of the handbook, covering such apparatus as motors and generators, industrial control, transformers, switch gear, measuring instruments, electric welding, etc., is complete in itself, all the rules relating to each product being grouped together. Standard definitions, abbreviations and symbols are also included for each class of apparatus.

Ingersoll-Rand Company, 11 Broadway, New York, has just completed the sixth edition of its popular 140-page, two-color book entitled, "100 AND 1 WAYS TO SAVE MONEY WITH PORTABLE COMPRESSORS." In this

Black Gum Rollers

Standard dragline sound heart black gum rollers recommended by all contractors as superior to maple, at one-third the cost. Send us a trial order for a set, and be convinced. Used exclusively in all southern levee building on soft soil, which is a hard test on rollers. They have proven superior to all other materials.

Doherty-Walsh Roller Co.
Baton Rouge, Louisiana

Meeting Place of Capital and Labor

The **KOENIG LABOR AGENCIES**
Established 1875

ST. LOUIS
612 Walnut Street
Main 2766 and 2767

KANSAS CITY
501 Delaware Street
Main 0796

Help of All Kinds Furnished Free

Don't Let These Short Days Handicap YOU

Only an extra hour or so a day often means the difference between success and failure on a job.

An electric light plant on your machine—shovel, dragline, crane or trench hoe — will enable you to work full time in spite of the short days in fall, winter, and early spring.

And before you buy a plant make sure that you:

1. Know the number, size and location of the lamps and reflectors which will give you the best results.
2. Get an outfit that is adequate to take care of the full load.
3. Get an outfit you can place so that it will not crowd or make the other machinery inaccessible.

BUCYRUS-ERIE COMPANY can supply for immediate shipment packings of all kinds, brake lining of all types, wire rope, electric light plants, dipper trips and railway crane equipment.

There is a plant that will exactly fill your requirements, whether your machine be steam, gasoline or Diesel Engine driven. Bucyrus-Erie is ready to supply this plant and to give you definite information as to placement of plant and lights.

Data on these outfits is ready for you—no obligation.

BUCYRUS-ERIE COMPANY
SPECIALTY DEPARTMENT
South Milwaukee, Wisconsin

BUCYRUS ERIE

BOOK REVIEWS — Continued

book the Company has embodied comparative cost data on its portable air compressors and air-operated tools (rock drills, paving breakers, clay diggers, backfill tampers, grinders, hoists, riveting hammers, chippers, metal drills, etc.). The information has been put together in handy-reference, cross-index form. In most cases, figures are presented on a man-hour basis, so that they can be readily applied to local conditions in any part of the world. Copies may be obtained by addressing Ingersoll-Rand Company at the above address or through any of their representatives.

Acheson Graphite Corporation of Niagara Falls, New York, have just issued a new catalog entitled INDUSTRIAL LUBRICATION. The sixty-four-page book describes sixty different types and consistencies of each lubricant, with definite instructions for machinery of all kinds. It also contains technical and engineering data of value to all operators of machinery. You will find this catalog not only of interest but of real practical value, and the section describing how lubricant acts, together with a very complete article on their purposes and a brief summary of the science of lubricating, is well worth reading.

Copies may be obtained by addressing the manufacturers of Gredag at the above address.

At the Oatmeal Convention

Short Scot: "Had ye a guid time at the McPherson's last night?"

Long Scot: "Glorious, mon, glorious! We started wi' seven corkscrews an' finish wi' 'em all straight!"

— Passing Show.

"At the hop last Saturday night my suspenders broke right out on the floor."

"Weren't you very embarrassed?"

"Well, not very. My roommate had them on."

FOR SALE

Space under this heading is available at the following rates:

1 to 3 inches.....$4.30 an inch
4 to 7 inches..... 4.10 an inch
8 to 14 inches..... 4.00 an inch

An inch is measured vertically on one column — three columns to a page. Any space may be used measured by the even inch in height and by one, two or three columns in width.

The price per inch is based on total space used — multiply ad space by number of continuous insertions.

FOR SALE

OVERSTOCK OF MOTOR GENERATOR SETS

The following equipment has not been used and is available for sale only because it does not suit our machines as now being built:

1 MG set, 90 h.p., 440 volts, KT-553-Y, 3-phase, 25-cycle, direct connected to 60 KW, RC-32B, 250 volts, D. C., complete with rheostat CR-8000, speed probably 1500 r.p.m.

3 MG sets, 75 H. P., 440 volts, KT-347, 6-pole, 3-phase, 60-cycle, 1150 R. P. M., direct connected to 50 KW, RC-35, 250 volt, D. C., compound wound, complete with compensator MI, CR-1030, mill-type, hand-operated and field rheostat CR-8000.

2 MG sets, 75 H. P., 2200 volts, KT-347, 6-pole, 3-phase, 60-cycle, 1150 R. P. M., direct connected, 50 KW, RC-35, 250 volts, D. C., compound wound, complete with compensator CR-1084, M-13, hand operated.

1 Motor, 90 H. P., 550 volts, KT-553-Y, 2-pole, 3-phase, 25-cycle, 1500 R. P. M. for changing 440-volt MG set to 550 volt.

BUCYRUS-ERIE COMPANY
Sales Department
South Milwaukee, Wisconsin

FOR SALE OR RENT

We will sell or rent our 20-B, 41-B or 50-B caterpillar-mounted steam shovels. In excellent condition. Ready for immediate delivery. Located near Pittsburgh. Address Box 1104, % The Excavating Engineer, South Milwaukee, Wisconsin.

FOR SALE CHEAP

BUCKEYE BACKFILLER, good condition.

BARBER-GREENE TRENCHING MACHINE, (6-foot) excellent shape.

¾-YARD THEW, gas, combination. Just overhauled.

R. C. Huffman Construction Co.
556 Terminal Tower, Cleveland, Ohio

ORTON STEAM CRANE mounted on caterpillar trucks, 50-foot boom, oil burner, in first-class condition. Address Box 800, The Excavating Engineer, South Milwaukee, Wisconsin.

FACTORY REBUILT
BUCYRUS-ERIE Shovels

High Lift 'B' ERIE Steam Shovel with power operated boom hoist and brand new caterpillar-type mounting.

High Lift Gas + Air ERIE Shovel on caterpillar-type mounting.

Type A Erie Steam Shovel, ¾-yard dipper, 16-foot boom and 13-foot dipper handle. Caterpillar mounting.

Completely rebuilt. Carry same guarantee as new machines. Immediate shipment.

Write or wire for prices and full information.

BUCYRUS-ERIE COMPANY
Erie, Pa.

MARION 37 STEAM SHOVEL, caterpillar mounted, 28-foot 6-inch boom, 19-foot handle, 1⅜-yard manganese front dipper, located near Pittsburg, Kansas. Machine used very little and in exceedingly good shape. Priced to sell.

TYPE 3-A THEW, located near Pittsburg, Kansas. 31-foot boom, 24-foot handle, 1-cubic-yard dipper, caterpillar mounted. Shop number about 2150. Shovel used very little and in very good condition. Equipped with new boiler. For immediate delivery. Address Box 805, The Excavating Engineer, South Milwaukee, Wisconsin.

LORAIN "75," about 2 years old, equipped with 1½-yard shovel combination and 45-foot boom, 1-yard dragline attachment. Ready for immediate delivery. Located near Omaha. Address Box 802, The Excavating Engineer, South Milwaukee, Wis.

MARION 26 STEAM SHOVEL, shop number about 2940. Equipped with 32-foot boom, 21-foot handle, mounted on 5-foot traction wheels. Can be inspected at Pittsburgh, Pennsylvania. Machine in excellent condition, ready for immediate delivery. Address Box 600, Excavating Engineer, South Milwaukee, Wisconsin.

DRAGLINES

Will buy
Steam, Gasoline, Diesel or Electric.
What have you to offer?
ZELNICKER in St. Louis

1¼ CUBIC YARD LINK-BELT GASOLINE SHOVEL, caterpillar mounted; purchased new in 1924. Located near Ottawa, Illinois. Address Box 1101, % The Excavating Engineer, South Milwaukee, Wisconsin.

ERIE "B" COMBINATION SHOVEL AND CRANE, traction wheel mounted, ⅝-cubic-yard clam bucket, 40-foot boom. Shop number about 1050. Good condition; ready to work. Priced right. Location in Southern Wisconsin.

ERIE TYPE "B" STEAM SHOVEL, mounted on caterpillars. Shop number 1616. Good condition, ready for work.

Address Box 504, % The Excavating Engineer, South Milwaukee, Wisconsin.

ONE 40-FOOT BOX-GIRDER BOOM, complete with drag drums and fittings, and **ONE-YARD CLASS 5 PAGE BUCKET.** Above equipment for Ga-2 Bucyrus-Erie. Used on one 30-day job. Immediate shipment. Address Wm. H. Ziegler Co., Inc., **619 Washington Ave., So., Minneapolis, Minn.**

MODEL 92 MARION SHOVEL, shop number about 3900. Equipped with 5-cubic-yard dipper. Recently overhauled. Excellent condition. Ready for prompt delivery. Location Kansas City. Address Box 602, Excavating Engineer, South Milwaukee, Wisconsin.

ONE 37 MARION ELECTRIC SHOVEL on caterpillars, in splendid condition and a rare bargain, and must be sold at once. Address,

The Pittsburg Boiler & Machine Co.
Pittsburg, Kansas

KOEHRING GAS MOUNTED SHOVEL, ¾-cubic-yard dipper. Machine three years old — price reasonable for quick sale. Location Cincinnati. Address Box 1100, % The Excavating Engineer, South Milwaukee, Wisconsin.

DREDGES

HYDRAULIC, DIPPER AND CLAMSHELL

Pumps, Cutters and Hoists, Sand and Gravel Pumping Plants.

JEAN M. ALLEN & CO.
Contracting and Consulting Engineers
332 S. Michigan Ave., CHICAGO